Lucid Energy Delaware, LLC
Frac Cat Compressor Station

Title V Permit Initial Application

August 2020

Prepared for:

Lucid Energy Delaware, LLC
3100 McKinnon St. #800
Dallas, Texas 75201

Prepared by:

Alliant Environmental, LLC
7804 Pan American Fwy. NE, Suite 5
Albuquerque, NM 87109

Mail Application To:		**For Department use only:**
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		AIRS No.:

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well. See Section 1-I for submittal instructions for other permits.

This application is submitted as (check all that apply)**:** ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed ☒ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC ☐ 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☒ Title V (new) ☐ Title V renewal ☐ TV minor mod. ☐ TV significant mod. TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ minor modification to a PSD source ☐ a PSD major modification

Acknowledgements:

☒ I acknowledge that a pre-application meeting is available to me upon request. ☒ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

☐ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).

☐ Check No.: in the amount of

☒ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.

☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.300.B(1) NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.): **N/A**	Updating Permit/NOI #: **N/A**
1	Facility Name: **Frac Cat Compressor Station**	Plant primary SIC Code (4 digits): **1311**	
		Plant NAIC code (6 digits): **211130**	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): **From Loving, NM, head north on N 4th St toward W Elm St. for 0.3 miles. Then turn right onto Oak Rd and continue for 417 ft. Then continue onto G R Howard Rd and continue for 1.6 miles. Then turn left onto State Hwy #387 and continue for 1.5 miles. Then turn right onto NM-31 and continue for 4.5 miles. Then turn right onto NM-128 E and continue for 22.8 miles. Then turn right onto J-1/Orla Rd and continue for 1.1 miles. Then turn onto an unnamed road for 0.75 miles and arrive at Frac Cat Compressor Station.**		

2	Plant Operator Company Name: **Lucid Energy Delaware, LLC**	Phone/Fax: **575-810-6021**
a	Plant Operator Address: **201 South Fourth Street, Artesia NM, 88210**	
b	Plant Operator's New Mexico Corporate ID or Tax ID: **36-4825214**	
3	Plant Owner(s) name(s): **Lucid Energy Delaware, LLC**	Phone/Fax: **575-810-6021**
a	Plant Owner(s) Mailing Address(s): **PO BOX 158, Artesia NM, 88211-0158**	
4	Bill To (Company): **Lucid Energy Delaware, LLC**	Phone/Fax: **575-810-6021**
a	Mailing Address: **PO BOX 158, Artesia NM, 88211-0158**	E-mail: **AP@lucid-energy.com**
5	☒ Preparer: **Martin R. Schluep** ☒ Consultant: **Alliant Environmental, LLC**	Phone/Fax: **505-205-4819**
a	Mailing Address: **7804 Pan American Fwy., Suite 5** **Albuquerque, NM 87109**	E-mail: **mschluep@alliantenv.com**
6	Plant Operator Contact: **Jaylen Fuentes**	Phone/Fax: **575-810-6051**
a	Address: **PO BOX 158, Artesia NM, 88211-0158**	E-mail: **jafuentes@lucid-energy.com**
7	Air Permit Contact: **Matthew Eales**	Title: **Vice President of EHSR**
a	E-mail: **MEales@lucid-energy.com**	Phone/Fax: **832-496-7513 / 575-748-4275**
b	Mailing Address: **PO BOX 158, Artesia NM, 88211-0158**	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☒ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☒ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☒ No	If yes, give month and year of shut down (MM/YY): **N/A**
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☐ Yes ☒ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☐Yes ☐No ☒ N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☐ Yes ☒ No	If yes, the permit No. is: **N/A**
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is: **N/A**
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is: **N/A**
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: **4221-M6**
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is: **N/A**

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: **3.1 MMscf/hour**	Daily: **75 MMscf/day**	Annually: **27,375 MMscf/year**
b	Proposed	Hourly: **3.1 MMscf/hour**	Daily: **75 MMscf/day**	Annually: **27,375 MMscf/year**

2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly: **3.1 MMscf/hour**	Daily: **75 MMscf/day**	Annually: **27,375 MMscf/year**
b	Proposed	Hourly: **3.1 MMscf/hour**	Daily: **75 MMscf/day**	Annually: **27,375 MMscf/year**

Section 1-D: Facility Location Information

1	Section: **21**	Range: **32E**	Township: **24S**	County: **Lea**	Elevation (ft): **3,541**
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☐ NAD 27 ☐ NAD 83 ☒ WGS 84	
a	UTM E (in meters, to nearest 10 meters): **624,060 m E**			UTM N (in meters, to nearest 10 meters): **3,563,430 m N**	
b	**AND** Latitude (deg., min., sec.): **32° 12' 02.10"**			Longitude (deg., min., sec.): **103° 41'01.52"**	
3	Name and zip code of nearest New Mexico town: **Loving, NM 88256**				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): **From Loving, NM, head north on N 4th St toward W Elm St. for 0.3 miles. Then turn right onto Oak Rd and continue for 417 ft. Then continue onto G R Howard Rd and continue for 1.6 miles. Then turn left onto State Hwy #387 and continue for 1.5 miles. Then turn right onto NM-31 and continue for 4.5 miles. Then turn right onto NM-128 E and continue for 22.8 miles. Then turn right onto J-1/Orla Rd and continue for 1.1 miles. Then turn onto an unnamed road for 0.75 miles and arrive at Frac Cat Compressor Station.**				
5	The facility is 24.3 miles southeast of Loving, NM.				
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☒ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: **Lea County NM, Eddy County, NM**				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? ☒ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: **22.2 km from Texas border**				
9	Name nearest Class I area: **Carlsbad Caverns National Park**				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): **72.5 km to Carlsbad Caverns National Park**				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: **1860 meters**				
12	Method(s) used to delineate the Restricted Area: **Continuous Fencing** "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility? **N/A**				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility **maximum** operating ($\frac{\text{hours}}{\text{day}}$): **24**	($\frac{\text{days}}{\text{week}}$): **7**	($\frac{\text{weeks}}{\text{year}}$): **52**	($\frac{\text{hours}}{\text{year}}$): **8,760**		
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: **N/A**		☐AM ☐PM	End:		☐AM ☐PM
3	Month and year of anticipated start of construction: **Facility is already operating under NSR 4221-M6**					

4	Month and year of anticipated construction completion: **Facility is already operating under NSR 4221-M6**
5	Month and year of anticipated startup of new or modified facility: **N/A**
6	Will this facility operate at this site for more than one year? ☒ Yes ☐ No

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify: **N/A**		
a	If yes, NOV date or description of issue: **N/A**		NOV Tracking No: **N/A**
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☒ No If Yes, provide the 1c & 1d info below:		
c	Document Title: **N/A**	Date: **N/A**	Requirement # (or page # and paragraph #): **N/A**
d	Provide the required text to be inserted in this permit: **N/A**		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☐ Yes ☒ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☒ **Major** (☒ ≥10 tpy of any single HAP **OR** ☒ ≥25 tpy of any combination of HAPS) **OR** ☐ **Minor** (☐ <10 tpy of any single HAP **AND** ☐ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☒ No		
a	If yes, include the name of company providing commercial electric power to the facility: **N/A** Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application

(This section applies to 20.2.72.300 NMAC Streamline applications only)

1	☐ I have filled out Section 18, "Addendum for Streamline Applications." ☒ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): **Matthew Eales**	Phone: **832-496-7513**
a	R.O. Title: **Vice President - EHSR**	R.O. e-mail: **MEales@lucid-energy.com**
b	R. O. Address: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): **Mike Latchem**	Phone: **214-420-4950**
a	A. R.O. Title: **President and CEO**	A. R.O. e-mail: **MLatchem@lucid-energy.com**
b	A. R. O. Address: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): **N/A**	
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): **Lucid Energy Group, LLC**	
a	Address of Parent Company: **3100 McKinnon St., Suite 800, Dallas TX 75201**	
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.): **N/A**	

6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: **Matthew Eales, Vice President – EHSR, 832-496-7513**
7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: **Texas – 22 km**

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☒ CD/DVD attached to paper application

☐ Secure electronic transfer. Air Permit Contact Name _____

Email _____

Phone number _____

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.

2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide

Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.

3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.

4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the core permit number (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

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Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Manufacturer	Model #	Serial #	Maximum or Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture or Reconstruction[2] / Date of Installation /Construction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
17-0533	Compressor Engine	Caterpillar	G3520B	TCP00122	1725	1725	12/10/2008 6/25/2013	N/A 17-0533	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
17-0534	Compressor Engine	Caterpillar	G3516	JEF03405-N6W	1380	1380	6/15/2012 5/7/2014	N/A 17-0534	20200253	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	4SLB	N/A
17-0530	Compressor Engine	Caterpillar	G3516 LE Plus	WPW-02285	1340	1340	6/24/2008 6/20/2014	N/A 17-0530	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
17-0529	Compressor Engine	Caterpillar	G3516	JEF03044-N6W	1380	1380	9/20/2010 7/14/2017	N/A 17-0529	20200253	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	4SLB	N/A
17-0590	Compressor Engine	Caterpillar	G3516	N6E00254-N6W	1380	1380	11/20/2014 5/15/2017	N/A 17-0590	20200253	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	4SLB	N/A
13-0104	Compressor Engine	Caterpillar	G3516	JEF03400-N6W	1380	1380	4/1/2011 5/12/2017	N/A 13-0104	20200253	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced	4SLB	N/A
17-0585	Compressor Engine	Caterpillar	G3606	4ZS02199	1775	1775	9/1/2015 5/12/2017	N/A 17-0585	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
18-1279	Compressor Engine	Caterpillar	G3516	N6W00784	1380	1380	10/19/2018 2018	N/A 18-1279	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
1	Compressor Engine	Caterpillar	G3516	TBD	1380	1380	TBD TBD	N/A 1	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
2	Compressor Engine	Caterpillar	G3516	TBD	1380	1380	TBD TBD	N/A 2	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
3	Compressor Engine	Caterpillar	G3606	TBD	1875	1875	TBD TBD	N/A 3	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
4	Compressor Engine	Caterpillar	G3606	TBD	1875	1875	TBD TBD	N/A 4	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
5	Compressor Engine	Caterpillar	G3608	TBD	2500	2500	TBD TBD	N/A 5	20200253	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	4SLB	N/A
Dehy-1	Glycol Dehydrator	Exterran	NA	NA	35 MMscfd	35 MMscfd	2010 NA	BTEX-1, RBL-1 RBL-1	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
Dehy-2	Glycol Dehydrator	TBD	NA	NA	35 MMscfd	35 MMscfd	TBD TBD	BTEX-2, RBL-2 RBL-2	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
Amine-1	Amine Unit	TBD	NA	NA	45 MMscfd	45 MMscfd	TBD TBD	Flare-1 Flare-1	31000301	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
Flare-1	Assist Gas Process Flare	TBD	NA	NA	28.8 MMBtu/hr	28.8 MMBtu/hr	TBD TBD	N/A Flare-1	30600904	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
RBL-1	Glycol Dehydrator Reboiler	Exterran	NA	9447	0.75 MMBtu/hr	0.75 MMBtu/hr	2010 N/A	N/A RBL-1	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
RBL-2	Glycol Dehydrator Reboiler	TBD	NA	TBD	1.25 MMBtu/hr	1.25 MMBtu/hr	TBD TBD	N/A RBL-2	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
RBL-3	Amine Unit Reboiler	TBD	NA	TBD	21 MMBtu/hr	21 MMBtu/hr	TBD TBD	N/A RBL-3	31000228	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

Unit Number[1]	Source Description	Manufacturer	Model #	Serial #	Maximum or Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture or Reconstruction[2] / Date of Installation /Construction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
T-1	Condensate / Oily Waste Water	NA	NA	TBD	300 bbl	300 bbl	TBD TBD	N/A N/A	40400310	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-2	Condensate / Oily Waste Water	NA	NA	4611	300 bbl	300 bbl	1/1/2010 TBD	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-3	Condensate / Oily Waste Water	NA	NA	4601	300 bbl	300 bbl	10/1/2009 TBD	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
T-4	Condensate / Oily Waste Water	NA	NA	TBD	300 bbl	300 bbl	TBD TBD	N/A N/A	40400311	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
FUG	Fugitive Emissions	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	30600801	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
SSM/M	Startup, Shutdown, Maintenance, and Malfunction	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	31088811	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.

[2] Specify dates required to determine regulatory applicability.

[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.

[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at http://www.env.nm.gov/aqb/forms/InsignificantListTitleV.pdf . TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No. / Serial No.	Max Capacity / Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) / Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] / Date of Installation /Construction[2]	For Each Piece of Equipment, Check Onc
CT-1	Glycol	Unknown	PWW 10169	1000 gal	NOT a source of regulated pollutants	04/2010 04/2010	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-7	Used Glycol	Unknown	TBD TBD	1500 gal	NOT a source of regulated pollutants	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-8	Used Oil	Unknown	TBD TBD	1500 gal	20.2.72.202.B.2(a)	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-9	Used Ambitrol	Unknown	TBD TBD	1500 gal	NOT a source of regulated pollutants	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-10	Ambitrol	Unknown	TBD TBD	1000 gal	NOT a source of regulated pollutants	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-11	Lube Oil	Unknown	TBD TBD	1500 gal	20.2.72.202.B.2(a)	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
CT-12	Methanol	Unknown	TBD TBD	100 bbl	NOT a source of regulated pollutants	TBD TBD	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
LOAD	Condensate / Waste Oil Loading	N/A	N/A N/A	N/A N/A	20.2.72.202.B.5	N/A N/A	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
HAUL	Unpaved Haul Road Emissions	N/A	N/A N/A	N/A N/A	20.2.72.202.B.5	N/A N/A	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
17-0533	Oxidative Catalyst	6/25/2013	CO, VOC, HCHO	17-0533	CO - 90%, VOC - 50%, HCOH - 80%	Catalyst Data
17-0534	Oxidative Catalyst	5/7/2014	CO, VOC, HCHO	17-0534	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
17-0530	Oxidative Catalyst	6/20/2014	CO, VOC, HCHO	17-0530	CO - 87%, VOC - 47%, HCOH - 80%	Catalyst Data
17-0529	Oxidative Catalyst	7/14/2017	CO, VOC, HCHO	17-0529	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
17-0590	Oxidative Catalyst	5/15/2017	CO, VOC, HCHO	17-0590	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
13-0104	Oxidative Catalyst	5/12/2017	CO, VOC, HCHO	13-0104	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
17-0585	Oxidative Catalyst	5/12/2017	CO, VOC, HCHO	17-0585	CO - 82%, VOC - 80%, HCOH - 95%	Catalyst Data
18-1279	Oxidative Catalyst	2018	CO, VOC, HCHO	18-1279	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
1	Oxidative Catalyst	TBD	CO, VOC, HCHO	1	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
2	Oxidative Catalyst	TBD	CO, VOC, HCHO	2	CO - 88%, VOC - 45%, HCOH - 80%	Catalyst Data
3	Oxidative Catalyst	TBD	CO, VOC, HCHO	3	CO - 85%, VOC - 40%, HCOH - 80%	Catalyst Data
4	Oxidative Catalyst	TBD	CO, VOC, HCHO	4	CO - 85%, VOC - 40%, HCOH - 80%	Catalyst Data
5	Oxidative Catalyst	TBD	CO, VOC, HCHO	5	CO - 82%, VOC - 48%, HCOH - 75%	Catalyst Data
Dehy-1, RBL-1	Condenser, Reboiler	2011	VOC, BTEX	Dehy-1	85%, 95%	Manufacture Data
Dehy-2, RBL-2	Condenser, Reboiler	TBD	VOC, BTEX	Dehy-2	85%, 95%	Manufacture Data
Flare-1	Assist Gas Process Flare	TBD	VOC, HAP, H_2S	Amine-1	98%	Manufacture Data

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions (under normal operating conditions)

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
18-1279	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0534	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0529	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0590	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
13-0104	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
1	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
2	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0530	1.48	6.47	8.98	39.34	1.33	5.82	0.17	0.74	0.12	0.54	0.12	0.54	0.12	0.54	-	-	-	-
17-0533	1.90	8.33	8.82	38.64	2.05	8.99	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
17-0585	1.96	8.57	10.76	47.13	3.72	16.28	0.18	0.81	0.13	0.59	0.13	0.59	0.13	0.59	-	-	-	-
3	2.07	9.05	9.09	39.83	1.20	5.25	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
4	2.07	9.05	9.09	39.83	1.20	5.25	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
5	2.76	12.07	12.29	53.83	1.43	6.28	0.26	1.12	0.19	0.82	0.19	0.82	0.19	0.82	-	-	-	-
Dehy-1	-	-	-	-	153.35	671.69	-	-	-	-	-	-	-	-	0.0027	0.012	-	-
Dehy-2	-	-	-	-	153.35	671.69	-	-	-	-	-	-	-	-	0.0027	0.012	-	-
Amine-1	-	-	-	-	37.26	163.22	-	-	-	-	-	-	-	-	0.50	2.17	-	-
Flare-1	0.028	0.12	0.13	0.55	-	-	0.0028	0.012	-	-	-	-	-	-	2.79E-06	1.22E-05	-	-
RBL-1	0.074	0.32	0.062	0.27	0.0040	0.018	0.0025	0.045	0.0019	0.024	0.0019	0.024	0.0019	0.024	6.94E-05	0.0016	-	-
RBL-2	0.12	0.54	0.10	0.45	0.0067	0.030	0.017	0.075	0.0093	0.041	0.0093	0.0093	0.0093	0.0093	4.78E-04	0.0021	-	-
RBL-3	2.06	9.02	1.73	7.57	0.11	0.50	0.0718	0.314	0.16	0.69	0.16	0.69	0.16	0.69	-	-	-	-
T-1	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-2	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-3	-	-	-	-	0.07	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-4	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
FUG	-	-	-	-	1.93	8.46	-	-	-	-	-	-	-	-	5.27E-05	2.31E-04	-	-
Totals	**25.16**	**110.18**	**112.81**	**494.13**	**367.46**	**1609.46**	**2.38**	**10.44**	**1.84**	**8.05**	**1.84**	**8.02**	**1.84**	**8.02**	**0.50**	**2.20**	**-**	**-**

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

"*" Indicates that an hourly limit is not appropriate for this operating situation and is not being requested.

"-" Indicates emissions of this pollutant are not expected

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or $1.41E^{-4}$).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
18-1279	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0534	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0529	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0590	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
13-0104	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
1	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
2	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	-	-
17-0530	1.48	6.47	1.17	5.11	0.70	3.09	0.17	0.74	0.12	0.54	0.12	0.54	0.12	0.54	-	-	-	-
17-0533	1.90	8.33	0.88	3.86	1.03	4.50	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
17-0585	1.96	8.57	1.96	8.58	0.74	3.22	0.18	0.81	0.13	0.59	0.13	0.59	0.13	0.59	-	-	-	-
3	2.07	9.05	1.36	5.97	0.72	3.15	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
4	2.07	9.05	1.36	5.97	0.72	3.15	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	-	-
5	2.76	12.07	2.21	9.69	0.75	3.26	0.26	1.12	0.19	0.82	0.19	0.82	0.19	0.82	-	-	-	-
Dehy-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dehy-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amine-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flare-1	1.97	8.64	9.00	39.41	0.75	3.26	1.11	4.84	-	-	-	-	-	-	0.010	0.044	-	-
RBL-1	0.10	0.43	0.083	0.36	0.43	1.90	0.013	0.056	0.0075	0.033	0.0075	0.033	0.0075	0.033	3.56E-04	1.56E-03	-	-
RBL-2	0.15	0.65	0.12	0.54	0.44	1.91	0.02	0.09	0.011	0.049	0.011	0.049	0.011	0.049	5.48E-04	2.40E-03	-	-
RBL-3	2.06	9.02	1.73	7.57	0.11	0.50	0.07	0.31	0.16	0.69	0.16	0.69	0.16	0.69	-	-	-	-
T-1	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-2	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-3	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
T-4	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	-	-
FUG	-	-	-	-	1.93	8.46	-	-	-	-	-	-	-	-	5.27E-05	2.31E-04	-	-
Totals	**27.15**	**118.92**	**26.09**	**114.29**	**14.21**	**62.25**	**3.49**	**15.30**	**1.84**	**8.07**	**1.84**	**8.07**	**1.84**	**8.07**	**0.011**	**0.049**	**-**	**-**

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

"*" Indicates that an hourly limit is not appropriate for this operating situation and is not being requested.

"-" Indicates emissions of this pollutant are not expected

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

☐ This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM^2		$PM10^2$		$PM2.5^2$		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
SSM/M	-	-	-	-	*	10.00	-	-	-	-	-	-	-	-	-	-	-	-
Totals	-	-	-	-	*	10.00	-	-	-	-	-	-	-	-	-	-	-	-

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

☑ I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the "-" symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		PM		PM10		PM2.5		□ H_2S or □ Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter or L x W (ft)
						(acfs)	(dscfs)			
18-1279	18-1279	V	No	21	982	151	N/A	N/A	192.7	1.0
17-0534	17-0534	V	No	21	982	151	N/A	N/A	192.7	1.0
17-0529	17-0529	V	No	21	982	151	N/A	N/A	192.7	1.0
17-0590	17-0590	V	No	21	982	151	N/A	N/A	192.7	1.0
13-0104	13-0104	V	No	21	982	151	N/A	N/A	192.7	1.0
1	1	V	No	23	982	151	N/A	N/A	192.7	1.0
2	2	V	No	23	982	151	N/A	N/A	192.7	1.0
17-0530	17-0530	V	No	21	952	155	N/A	N/A	197.8	1.0
17-0533	17-0533	V	No	21	981	149	N/A	N/A	106.5	1.3
17-0585	17-0585	V	No	21	847	202	N/A	N/A	114.6	1.5
3	3	V	No	23	835	197	N/A	N/A	111.5	1.5
4	4	V	No	23	835	197	N/A	N/A	111.5	1.50
5	5	V	No	23	851	266	N/A	N/A	150.5	1.50
Flare-1	Flare-1	V	No	20	1832	796	N/A	N/A	40.0	1.50
RBL-1	RBL-1	V	No	15	624	6	N/A	N/A	4.5	1.00
RBL-2	RBL-2	V	No	15	624	10	N/A	N/A	4.5	1.00
RBL-3	RBL-3	V	No	30	600	3	N/A	N/A	0.8	2.33

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate greater than or equal to one (1) ton per year For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Formaldehyde ☑ HAP or ☐ TAP		Acetaldehyde ☑ HAP or ☐ TAP		Acrolein ☑ HAP or ☐ TAP											
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
18-1279	18-1279	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
17-0534	17-0534	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
17-0529	17-0529	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
17-0590	17-0590	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
13-0104	13-0104	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
1	1	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
2	2	0.33	1.58	0.26	1.15	0.015	0.067	0.052	0.23										
17-0530	17-0530	0.24	1.14	0.17	0.72	0.015	0.065	0.050	0.22										
17-0533	17-0533	0.43	2.04	0.34	1.50	0.019	0.083	0.064	0.28										
17-0585	17-0585	0.22	0.90	0.08	0.34	0.020	0.086	0.066	0.29										
3	3	0.26	1.31	0.17	0.72	0.021	0.090	0.070	0.31										
4	4	0.26	1.31	0.17	0.72	0.021	0.090	0.070	0.31										
5	5	0.45	2.17	0.32	1.39	0.028	0.12	0.093	0.41										
RBL-1	Dehy-1	-	-	-	-	-	-	-	-										
RBL-2	Dehy-2	-	-	-	-	-	-	-	-										
Flare-1	Amine-1	-	-	-	-	-	-	-	-										
Flare-1	Flare-1	0.31	1.36	-	-	-	-	-	-										
RBL-1	RBL-1	0.06	0.28	0.00	0.00	-	-	-	-										
RBL-2	RBL-2	0.07	0.31	0.00	0.00	-	-	-	-										
RBL-3	RBL-3	0.30	1.33	0.02	0.08	-	-	-	-										
T-1	T-1	0.01	0.05	-	-	-	-	-	-										
T-2	T-2	0.01	0.05	-	-	-	-	-	-										
T-3	T-3	0.01	0.05	-	-	-	-	-	-										
T-4	T-4	0.01	0.05	-	-	-	-	-	-										
FUG	FUG	0.57	2.48	-	-	-	-	-	-										
SSM/M	SSM/M	-	-	-	-	-	-	-	-										
Totals:		5.55	25.85	3.1	13.50	0.23	1.00	0.78	3.40										

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (No. 2 Diesel, Natural Gas, Coal, …)	Specify Units				
		Lower Heating Value	Hourly Usage (Mscf/hr)	Annual Usage (MMscf/yr)	% Sulfur	% Ash
18-1279	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
17-0534	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
17-0529	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
17-0590	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
13-0104	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
1	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
2	Natural Gas	1045 Btu/scf	10.91	95.59	0.05 gr/scf	N/A
17-0530	Natural Gas	1045 Btu/scf	11.89	104.20	0.05 gr/scf	N/A
17-0533	Natural Gas	1045 Btu/scf	13.53	118.50	0.05 gr/scf	N/A
17-0585	Natural Gas	1045 Btu/scf	12.93	113.23	0.05 gr/scf	N/A
3	Natural Gas	1045 Btu/scf	13.57	118.86	0.05 gr/scf	N/A
4	Natural Gas	1045 Btu/scf	13.57	118.86	0.05 gr/scf	N/A
5	Natural Gas	1045 Btu/scf	17.91	156.90	0.05 gr/scf	N/A
Flare-1	Natural Gas	1045 Btu/scf	23.74	207.94	0.05 gr/scf	N/A
RBL-1	Natural Gas	1045 Btu/scf	0.72	6.29	0.05 gr/scf	N/A
RBL-2	Natural Gas	1045 Btu/scf	1.20	10.48	0.05 gr/scf	N/A
RBL-3	Natural Gas	1045 Btu/scf	20.10	176.04	0.05 gr/scf	N/A

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)
T-1	40400311	Condensate/Oily Waste Water	Condensate/Oily Waste Water	7.87	23.14	69.82	14.70	69.82	14.70
T-2	40400311	Condensate/Oily Waste Water	Condensate/Oily Waste Water	7.87	23.14	69.82	14.70	69.82	14.70
T-3	40400311	Condensate/Oily Waste Water	Condensate/Oily Waste Water	7.87	23.14	69.82	14.70	69.82	14.70
T-4	40400311	Condensate/Oily Waste Water	Condensate/Oily Waste Water	7.87	23.14	69.82	14.70	69.82	14.70

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 10.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			
T-1	TBD	Condensate	FX	NA	300	47.7	4.72	0.61	LG	LG	Good	251,348	19.9
T-2	2012	Condensate	FX	NA	300	47.7	4.72	0.61	LG	LG	Good	251,348	19.9
T-3	2012	Condensate	FX	NA	300	47.7	4.72	0.61	LG	LG	Good	251,348	19.9
T-4	2014	Condensate	FX	NA	300	47.7	4.72	0.61	LG	LG	Good	251,348	19.9

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
Note: 1.00 bbl = 0.159 M^3 = 42.0 gal					**BL**: Black	
					OT: Other (specify)	

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
Natural Gas Processing	Natural Gas	Gas	75 MMscf/day	Natural Gas Production	Natural Gas	Gas	75 MMscf/day
				Condensate	Condensate	Liquid	23937.9 bbl/yr

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
N/A - No CEM equipment is present at the facility.									

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
N/A - No parametric emissions measurement equipment is present at the facility.								

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC ton/yr[2]									**Total GHG** Mass Basis ton/yr[4]	**Total CO_2e** ton/yr[5]
Unit No.	**GWPs [1]**	**1**	**298**	**25**	**22,800**	**footnote 3**										
18-1279	**mass GHG**	6,302.97	3.69E-05	45.33	-	-									6,348.3	
	CO2e	6,302.97	0.011	1,133	-	-										7,436.3
17-0534	**mass GHG**	6,302.97	3.69E-05	45.3	-	-									6,348.3	
	CO2e	6,302.97	0.01	1,133	-	-										7,436.3
17-0529	**mass GHG**	6,302.97	3.69E-05	45.3	-	-									6,348.3	
	CO2e	6,302.97	0.01	1,133	-	-										7,436.3
17-0590	**mass GHG**	6,302.97	3.69E-05	45.3	-	-									6,348.3	
	CO2e	6,302.97	0.01	1,133	-	-										7,436.3
13-0104	**mass GHG**	6,302.97	3.69E-05	45.3	-	-									6,348.3	
	CO2e	6,302.97	0.01	1,133	-	-										7,436.3
1	**mass GHG**	6,302.97	3.69E-05	45.33	-	-									6,348.3	
	CO2e	6,302.97	0.01	1133	-	-										7,436.3
2	**mass GHG**	6,302.97	3.69E-05	45.33	-	-									6,348.3	
	CO2e	6,302.97	0.01	1133	-	-										7,436.3
17-0530	**mass GHG**	6,870.7	4.03E-05	42.06	-	-									6,912.8	
	CO2e	6,870.7	0.012	1051.6	-	-										7,922.3
17-0533	**mass GHG**	7,595.5	4.58E-05	64.22	-	-									7,659.8	
	CO2e	7,595.5	0.014	1605.6	-	-										9,201.1
17-0585	**mass GHG**	7,576	4.38E-05	77.17	-	-									7,652.914	
	CO2e	7,576	0.013	1929.24	-	-										9,505.00
3	**mass GHG**	7,840	4.59E-05	63.42	-	-									7,903.019	
	CO2e	7,840	0.014	1585.48	-	-										9,425.10
4	**mass GHG**	7839.6	4.59E-05	63.42	-	-									7,903.0	
	CO2e	7839.6	0.014	1585.48	-	-										9,425.1
5	**mass GHG**	10356.2	4.59E-05	63.42	-	-									10,419.7	
	CO2e	10356.2	0.018	1784.46	-	-										12,140.7
Flare-1	**mass GHG**	72,699.57	0.15	313.00	-	-									73,012.7	
	CO2e	72,699.57	43.329415	7824.9196	-	-										80,567.8
RBL-1	**mass GHG**	413.66	7.24E-04	3.46	-	-									417.1	
	CO2e	413.66	0.22	86.47	-	-										500.3
RBL-2	**mass GHG**	669.8	0.0012	3.46	-	-									673.3	
	CO2e	669.8	0.36	86.59	-	-										756.8
RBL-3	**mass GHG**	10728.9	0.0202	0.202	-	-									10,729.1	
	CO2e	10728.9	6.03	5.06	-	-										10,740.0
FUG	**mass GHG**	5.84	-	14.76	-	-									20.6	
	CO2e	5.84	-	368.93	-	-										374.8
Total	**mass GHG**	176,716.05	0.17	1,025.93	-	-									166,319.1	
	CO_2e	176716.05	50.10	25847.11	-	-										190,741.7

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

The **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

Lucid Energy Delaware, LLC is submitting this application pursuant to 20.2.70.300.B(1) for the Frac Cat Compressor Station. The facility is located approximately 24.3 miles southeast of Loving, New Mexico in Lea County. The Frac Cat Compressor Station currently operates under NSR permit number 4221-M6, issued April 3, 2019. The 2019 NSR revision put the site above major source thresholds under 20.2.70 NMAC (Title V regulations) and as such Lucid is submitting this application within 12 months of the start of operation of the site as a major source. With this application Lucid is also updating equipment serial numbers based on the most recent onsite audit.

The Frac Cat Compressor Station is an extension of a local gas transportation system that gathers wellhead gas from multiple wells in the area. The facility compresses the gas for delivery.

Lucid is requesting the following equipment be included in the Title V permit:

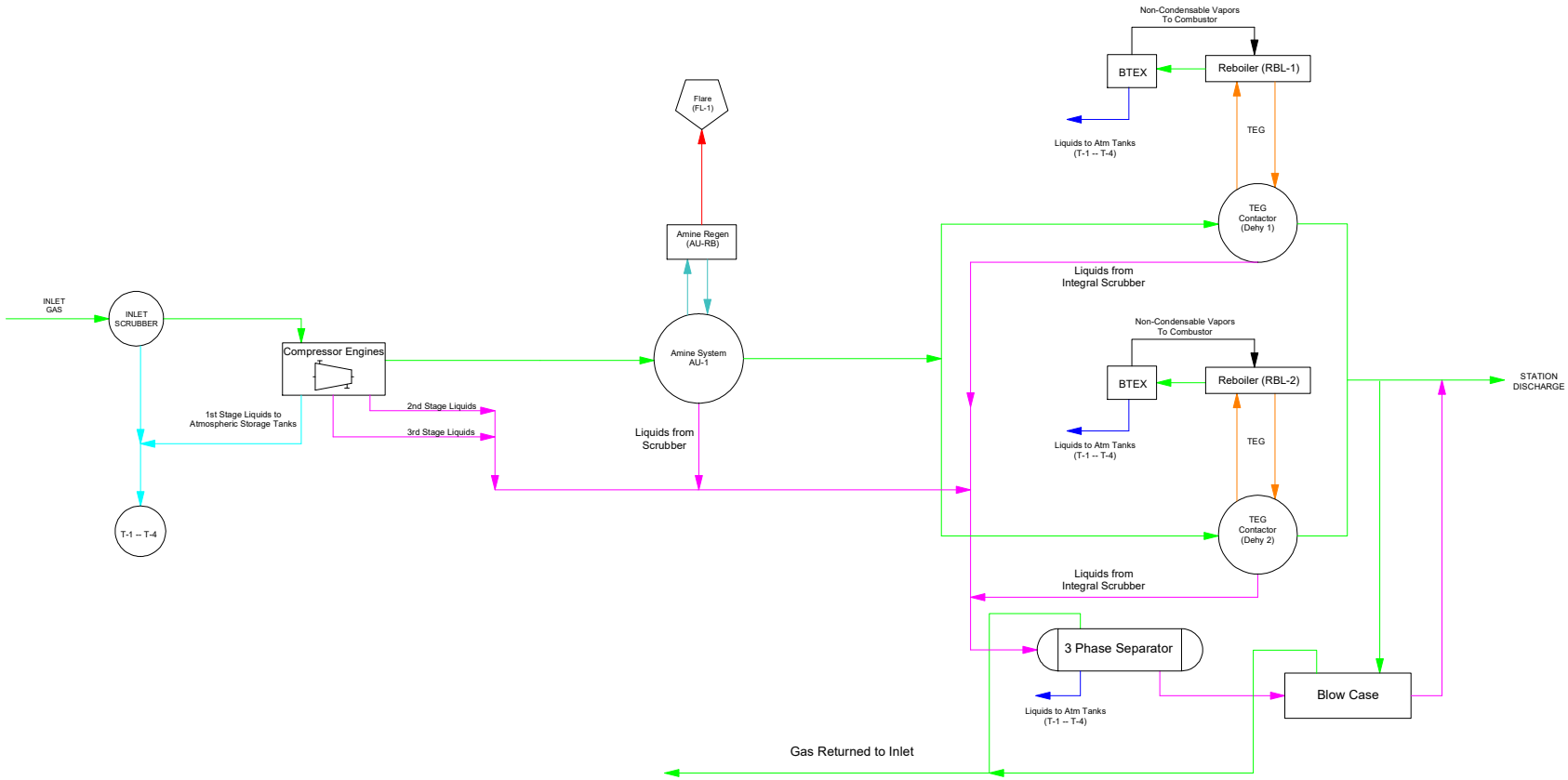
- Thirteen (13) Compressor Engines
- Two (2) TEG Dehydration units
- Two (2) Dehydration unit reboilers
- One (1) Amine System
- One (1) Amine system reboiler
- Four (4) Atmospheric Storage tanks
- One (1) Process Flare
- Condensate/Oil loading emissions
- Haul road fugitives
- Facility-wide fugitives
- Startup, shutdown, maintenance emissions (Unit SSM/M)

Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

See the attached Process Flow Diagram.



LEGEND
GAS
LOW PRESSURE LIQUIDS
HIGH PRESSURE LIQUIDS
WASTE WATER
TRI-ETHYLENE GLYCOL (TEG)
AMINE
STILL VENT EMISSIONS

REFERENCE DRAWINGS	SPECIAL NOTES
	1. INSTRUMENT LETTER DESIGNATIONS PER ANSI/ISA-S5.1 (LATEST EDITION) 2. FOR BLOCK VALVES - USE BALL OR GATE VALVES UP TO 275°F DESIGN TEMPERATURES AND GATE VALVES FOR HIGHER DESIGN TEMPERATURES. 3. ALL DRAIN PIPING TO BE FREE DRAINING. 4. ALL PIPING TO PSV's TO BE FREE DRAINING. 5. PROVIDE VENTS WITH 0.5" VALVES ON ALL HIGH POINTS, AND DRAINS WITH 0.75" VALVES ON ALL LOW POINTS.

REVISIONS				
REV.	DATE	BY	DESCRIPTION	APP'D.

DRAWN BY: KE
CHECKED BY:
APPROVAL:
APPROVAL: N/A
DATE: 12/10/2018
SCALE: N.T.S.

LUCID energy group

LUCID ENERGY DELAWARE

FRAC CAT COMPRESSOR STATION BLOCK FLOW DIAGRAM

LEA COUNTY

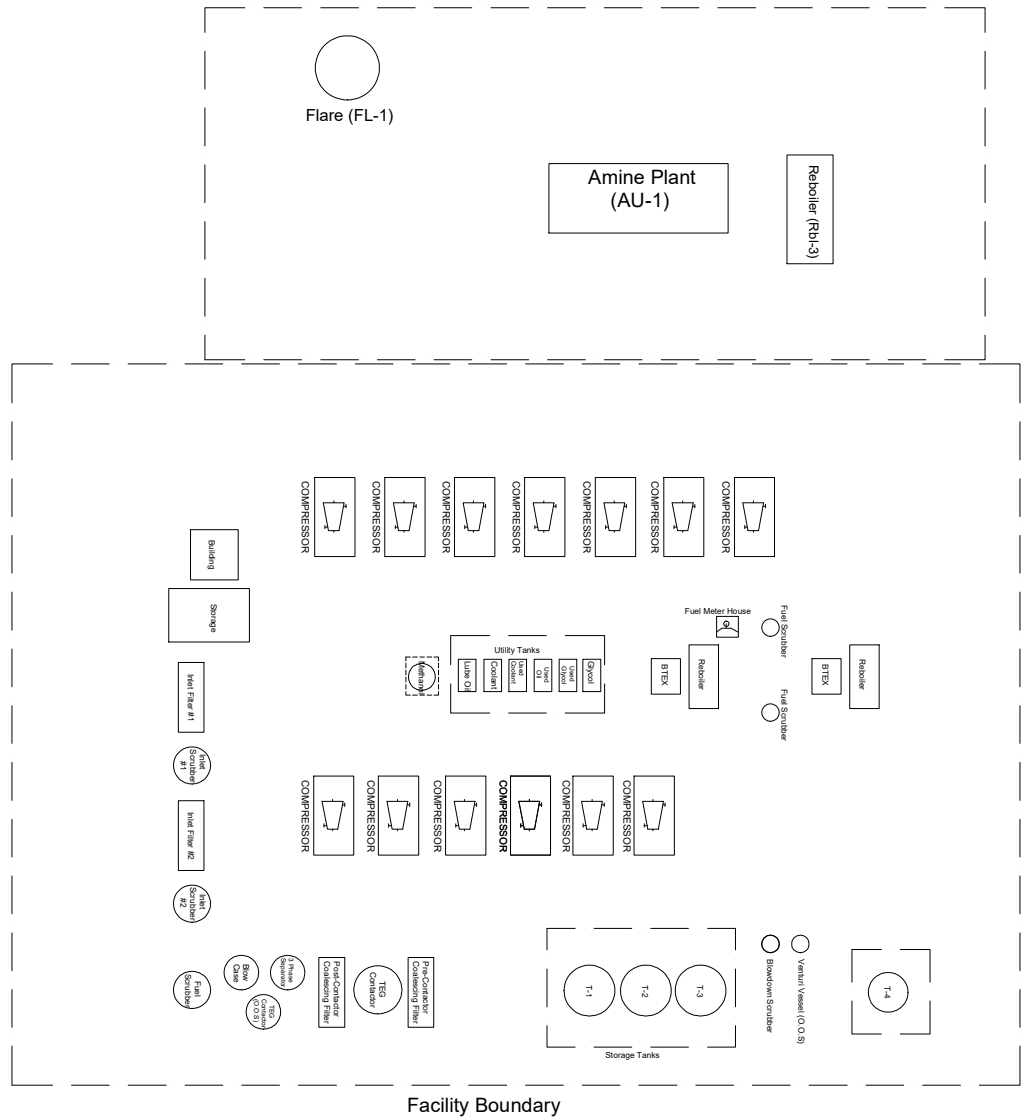
JOB #	DWG #	REV
		1

Section 5

Plot Plan Drawn To Scale

A **plot plan drawn to scale** showing emissions points, roads, structures, tanks, and fences of property owned, leased, or under direct control of the applicant. This plot plan must clearly designate the restricted area as defined in UA1, Section 1-D.12. The unit numbering system should be consistent throughout this application.

A plot plan is presented on the following page.



REFERENCE DRAWINGS	SPECIAL NOTES
	1. INSTRUMENT LETTER DESIGNATIONS PER ANSI/ISA-S5.1 (LATEST EDITION) 2. FOR BLOCK VALVES - USE BALL OR GATE VALVES UP TO 275°F DESIGN TEMPERATURES AND GATE VALVES FOR HIGHER DESIGN TEMPERATURES. 3. ALL DRAIN PIPING TO BE FREE DRAINING. 4. ALL PIPING TO PSV's TO BE FREE DRAINING. 5. PROVIDE VENTS WITH 0.5" VALVES ON ALL HIGH POINTS, AND DRAINS WITH 0.75" VALVES ON ALL LOW POINTS.

REVISIONS				
REV.	DATE	BY	DESCRIPTION	APP'D.

DRAWN BY: KE
CHECKED BY:
APPROVAL:
APPROVAL: N/A
DATE: 12/20/2018
SCALE: N.T.S.

LUCID energy group

LUCID ENERGY DELAWARE

FRAC CAT COMPRESSOR STATION PLOT PLAN

LEA COUNTY

JOB #	DWG #	REV

Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The "Calculations" tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional "Calc" tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant's responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer's maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.

B. At least 5 significant figures shall be retained in all intermediate calculations.

C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

(1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;

(2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**

(3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.

(4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device

regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

Compressor Engines (Units 17-0585, 13-0104, 17-0590, 17-0529, 17-0530, 17-0533, 17-0534, 18-1279, 1, 2, 3, 4, and 5)
Uncontrolled emissions of NOx, CO, VOC (NMEHC), and formaldehyde (HCHO) from these units were calculated using Caterpillar® manufacturer's data. Emissions of SO_2 were calculated using a fuel sulfur pipeline content of 5 grains total sulfur per 100 scf and an assumed 100% conversion of fuel elemental sulfur to SO_2. Particulate emissions were calculated based on AP-42 Table 3.2-2 emission factors. The uncontrolled GHG emissions were calculated according to 40 CFR 98 Subparts A and C. HAP emissions were calculated using HAPCalc® 3.01, but the formaldehyde emissions were adjusted based on the engine and catalyst emission rates for the uncontrolled and controlled scenarios, respectively. Controlled engine emissions were based on reduction efficiencies provided in catalyst specification sheets.

Glycol Dehydrators (Units Dehy-1 and Dehy-2)
The regenerator and flash tank emissions for Dehy-1 and Dehy-2 are calculated using a BR&E ProMax simulation. The dehydrator configurations include a flash tank that uses recycle and recompression as a control option with an associated 100% efficiency as well as a BTEX condenser. Controlled emissions are represented under the reboilers associated with the glycol dehydrators (Units RBL-1 and RBL-2), which control condenser overhead VOC, HAP and H_2S emissions with a 95% reduction efficiency.

Glycol Dehydrator Reboilers (Units RBL-1 and RBL-2)
Reboiler fuel combustion emissions (Units RBL-1 and RBL-2) are calculated using emission factors from AP-42 Tables 1.4-1 and 1.4-2 while GRI-HAPCalc® 3.01 was used to estimate HAP emissions from the reboiler fuel combustion. Controlled emissions for these units also represent VOC, HAP, and H_2S emissions from the glycol dehydrator BTEX condenser, which are controlled with a 95% reduction efficiency.

Amine Unit (Unit Amine-1)
Acid gas emissions from the amine unit (Unit Amine-1) are calculated using a BR&E ProMax simulation. Controlled emissions from this unit are represented under the process flare (Unit Flare-1), which controls VOCs, H_2S, and HAPs from the amine unit with a reduction efficiency of 98%.

Amine Unit Reboiler (Unit RBL-3)
Reboiler fuel combustion emissions (Unit RBL-3) are calculated using emission factors from AP-42 Tables 1.4-1 and 1.4-2 while GRI-HAPCalc® 3.01 was used to estimate HAP emissions from the reboiler fuel combustion. The amine unit reboiler is not used to control any emissions from the amine unit (Unit Amine-1).

Assist Gas Process Flare (Unit Flare-1)
This process flare employs a supplemental fuel gas stream to be able to efficiently combust the acid gas from the amine unit, which has a relatively low heating value. The quantity of assist needed is calculated such that the stream of gas to the flare achieves a heating value of at least 200 Btu/scf. Emissions factors for the flare are referenced from AP-42 Tables 13.5-1 and 13.5-2. Fuel gas is assumed to have H_2S and SO_2 quantities of 0.25 and 5 gr/scf, respectively.

Condensate / Oily Waste Water Tanks (Units T-1, T-2, T-3, and T-4)
Flashing, working, and breathing emissions from the tanks are calculated using a BR&E ProMax simulation representing liquids removed from various processes at the facility.

Condensate / Oily Waste Water Loading (Unit LOAD)
Loading emissions from the condensate/waste oil storage tanks are calculated using a BR&E ProMax simulation. This unit is exempt pursuant to 20.2.72.202.B(5) NMAC.

Unpaved Truck Hauling Emissions (Unit HAUL)
Unpaved haul road emissions are calculated using AP-42 13.2.2 Equations 1a and 2. This unit is exempt pursuant to 20.2.72.202.B(5) NMAC.

Fugitive Emissions (Unit FUG)
Fugitive emissions were calculated using component counts provided by facility engineers and emissions factors referenced from the "Protocol for Equipment Leak Emission Estimates" from the EPA (Table 2-4). Analysis from derived from the BR&E ProMax simulation were used to estimate the composition of Gas and Liquid composition.

Startup, Shutdown, and Maintenance/Malfunction (Unit SSM/M)
Lucid is requesting 10 tpy VOC emissions associated with Startup, Shutdown and Maintenance (SSM) and Malfunction activities at the facility.

There are two types of blowdown events: unit blowdowns and facility blowdowns. Unit blowdowns are typically associated with SSM activities because they are predictable and they can be scheduled in most cases. Unit blowdowns occur each time a unit is taken offline for maintenance and/or during startup. Regularly scheduled blowdowns would occur every month for regularly scheduled maintenance. Units are usually offline for two hours or less during a normal preventative maintenance procedure.

Facility blowdowns are emergency events that cannot be anticipated. These occur when the inlet valve must be shut due to unforeseen circumstances such as control valve failure. Facility shut downs are rare and thus would not be considered SSM events, they are considered malfunctions.

Based on the above description, Lucid has determined to request a maximum VOC emission limit of 10 tons per year to account for Startup, Shutdown, and Maintenance/Malfunction (SSM/M). In accordance with “Implementation Guidance for permitting SSM Emissions and Excess Emission” document issued 7 June 2012, "Instead of permitting SSM and upset/malfunction emissions separately, the applicant may request that emissions from both SSM and upset/malfunction be consolidated in the permit with a total limit of 10 tons per year per pollutant per facility for the combined category to reduce concerns about the appropriateness of activities listed as SSM."

Section 6.a
Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following □ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Greenhouse gas emissions have been calculated and are included in Section 6. These emissions are also included in Table 2-P in Section 2 of this application.

Lucid Energy Delaware - Frac Cat Compressor Station

Emissions Summary

Maximum Uncontrolled Emissions																			
Unit	Description	NOx		CO		VOCs		SOx		TSP		PM_{10}		$PM_{2.5}$		H_2S		Total HAPs	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
18-1279	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0534	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0529	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0590	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
13-0104	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
1	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
2	CAT 3516	1.52	6.66	7.39	32.38	1.46	6.40	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0530	CAT 3516 TALE	1.48	6.47	8.98	39.34	1.33	5.82	0.17	0.74	0.12	0.54	0.12	0.54	0.12	0.54	-	-	0.90	4.04
17-0533	CAT 3520B	1.90	8.33	8.82	38.64	2.05	8.99	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	1.80	8.04
17-0585	CAT 3606 A3	2.0	8.6	10.8	47.1	3.7	16.3	0.18	0.81	0.13	0.59	0.13	0.59	0.13	0.59	-	-	1.71	7.41
3	CAT 3606 A4	2.1	9.1	9.1	39.8	1.2	5.3	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	0.92	4.21
4	CAT 3606 A4	2.1	9.1	9.1	39.8	1.2	5.3	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	0.92	4.21
5	CAT3608	2.8	12.1	12.3	53.8	1.4	6.3	0.26	1.12	0.19	0.82	0.19	0.82	0.19	0.82	-	-	1.40	6.34
Dehy-1	Glycol Dehydrator	-	-	-	-	153.4	671.7	-	-	-	-	-	-	-	-	0.0027	0.012	94.3	413.0
Dehy-2	Glycol Dehydrator	-	-	-	-	153.4	671.7	-	-	-	-	-	-	-	-	0.0027	0.012	94.3	413.0
Amine-1	Amine Unit	-	-	-	-	37.3	163.2	-	-	-	-	-	-	-	-	0.50	2.17	15.5	68.0
Flare-1	Process Flare	0.0277	0.121	0.126	0.55	-	-	2.80E-03	0.0122	-	-	-	-	-	-	2.79E-06	1.22E-05	-	-
RBL-1	Reboiler (Dehy-1)	0.074	0.32	0.062	0.27	0.0040	0.018	0.002	0.045	0.0019	0.024	0.0019	0.024	0.0019	0.024	6.94E-05	0.0016	0.011	0.047
RBL-2	Reboiler (Dehy-2)	0.12	0.54	0.10	0.45	0.0067	0.030	0.017	0.075	0.0093	0.041	0.0093	0.009	0.0093	0.009	4.78E-04	0.0021	0.018	0.079
RBL-3	Reboiler (Amine-1)	2.06	9.02	1.73	7.57	0.1132	0.496	0.072	0.314	0.1565	0.685	0.1565	0.685	0.1565	0.685	-	-	0.30	1.33
T-1	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-2	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-3	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-4	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
FUG	Fugitive Emissions	-	-	-	-	1.93	8.46	-	-	-	-	-	-	-	-	5.27E-05	2.31E-04	0.57	2.5
SSM/M	Start-up Shutdown, Maintenance / Malfunction	-	-	-	-	*	10.00	-	-	-	-	-	-	-	-	-	-	-	-
Totals		***25.16***	***110.18***	***112.81***	***494.13***	***367.46***	***1,619.46***	***2.38***	***10.44***	***1.84***	***8.05***	***1.84***	***8.02***	***1.84***	***8.02***	***0.50***	***2.20***	***215.02***	***943.33***

Maximum Controlled Emissions																			
Unit	**Description**	**NOx**		**CO**		**VOCs**		**SOx**		**TSP**		**PM_{10}**		**$PM_{2.5}$**		**H_2S**		**Total HAPs**	
		lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
18-1279	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0534	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0529	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0590	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
13-0104	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
1	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
2	CAT 3516	1.52	6.66	0.89	3.89	0.80	3.52	0.16	0.68	0.11	0.50	0.11	0.50	0.11	0.50	-	-	0.33	1.58
17-0530	CAT 3516 TALE	1.48	6.47	1.17	5.11	0.70	3.09	0.17	0.74	0.12	0.54	0.12	0.54	0.12	0.54	-	-	0.24	1.14
17-0533	CAT 3520B	1.90	8.33	0.88	3.86	1.03	4.50	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	0.43	2.04
17-0585	CAT 3606 A3	1.96	8.57	1.96	8.58	0.74	3.22	0.18	0.81	0.13	0.59	0.13	0.59	0.13	0.59	-	-	0.22	0.90
3	CAT 3606 A4	2.07	9.05	1.36	5.97	0.72	3.15	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	0.26	1.31
4	CAT 3606 A4	2.07	9.05	1.36	5.97	0.72	3.15	0.19	0.85	0.14	0.62	0.14	0.62	0.14	0.62	-	-	0.26	1.31
5	CAT3608	2.76	12.07	2.21	9.69	0.75	3.26	0.26	1.12	0.19	0.82	0.19	0.82	0.19	0.82	-	-	0.45	2.17
Dehy-1	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dehy-2	Glycol Dehydrator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amine-1	Amine Unit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flare-1	Process Flare	1.97	8.64	9.00	39.41	0.75	3.26	1.11	4.84	-	-	-	-	-	-	0.010	0.044	0.31	1.36
RBL-1	Reboiler (Dehy-1)	0.10	0.43	0.08	0.36	0.43	1.90	0.013	0.056	0.0075	0.033	0.0075	0.033	0.0075	0.033	3.56E-04	0.0016	0.0628	0.275
RBL-2	Reboiler (Dehy-2)	0.15	0.65	0.12	0.54	0.4369	1.913	0.020	0.086	0.0112	0.049	0.0112	0.049	0.0112	0.049	5.48E-04	0.0024	0.070	0.31
RBL-3	Reboiler (Amine-1)	2.06	9.02	1.73	7.57	0.11	0.50	0.0718	0.314	0.16	0.69	0.16	0.69	0.16	0.69	-	-	0.30	1.33
T-1	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-2	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-3	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
T-4	Condensate Tank	-	-	-	-	0.070	0.31	-	-	-	-	-	-	-	-	1.39E-05	6.11E-05	0.010	0.045
FUG	Fugitive Emissions	-	-	-	-	1.93	8.46	-	-	-	-	-	-	-	-	5.27E-05	2.31E-04	0.566	2.477
SSM/M	Start-up Shutdown, Maintenance / Malfunction	-	-	-	-	*	10.00	-	-	-	-	-	-	-	-	-	-	-	-
Totals		***27.15***	***118.92***	***26.09***	***114.29***	***14.21***	***72.25***	***3.49***	***15.30***	***1.84***	***8.07***	***1.84***	***8.07***	***1.84***	***8.07***	***0.011***	***0.049***	***5.55***	***25.85***

"*" Indicates that an hourly limit is not appropriate for this operating situation and is not being requested.

"-" Indicates emissions of this pollutant are not expected

Caterpillar G3516

Emission Units:	18-1279, 17-0534, 17-0529, 17-0590, 13-0140, 1, 2
Source Description:	Natural gas engine
Manufacturer:	Caterpillar
Model:	G3516
Type	4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	1380	hp	*Mfg data*
Heat Rate	8263	Btu/hp-hr	*Mfg data, HHV*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	11.40	MMBtu/hr	Heat Rate * hp
Fuel consumption	10.91	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	95.6	MMscf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Mfg. data*
CO	2.43	g/hp-hr	*Mfg. data*
NMNEHC (VOC)	0.48	g/hp-hr	*Mfg. data*
Formaldehyde	0.43	g/hp-hr	*Mfg. data*
CO_2	473	g/hp-hr	*Mfg. data*
CH_4	4.05	g/hp-hr	*Mfg. data (THC - NMHC)*

Exhaust Parameters

Exhaust temp	982	deg F	*Catalyst data*
Stack diameter	1.00	ft	*Provided by client*
Stack height	21(old) or 23(new)	ft	*Provided by client*
Exhaust flow	9,080	acfm	*Catalyst data*
Stack velocity	192.7	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
1.5	7.4	1.5	0.16	0.11	1.3	1.4	0.015	0.052	3.88E-04	1.60E-04	0.0006	0.0041	0.0018	1,439	259	0.003	lb/hr
6.7	32.4	6.4	0.68	0.50	5.7	6.2	0.07	0.23	0.0017	7.00E-04	0.0027	0.0179	0.0081	6,303	1,133	0.011	tpy
														5,718	1028	0.010	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	88%	45%			80%												Nominal % reduction[6]
1.5	0.89	0.80	0.16	0.11	0.26	0.33	0.015	0.052	0.000	0.000	0.001	0.004	0.002	1,439	259	0.003	lb/hr
6.66	3.89	3.52	0.68	0.50	1.15	1.58	0.067	0.226	0.002	0.001	0.003	0.018	0.008	6,303	1,133	0.011	tpy
														5,718	1,028	0.010	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Lucid Energy Delaware - Frac Cat Compressor Station

Caterpillar G3516 TALE

Emission Units: 17-0530
Source Description: Natural gas engine
Manufacturer: Caterpillar
Model: G3516 TALE
Type 4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	1340	hp	*Mfg data*
Heat Rate	9276	Btu/hp-hr	*Mfg data, HHV*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	12.43	MMBtu/hr	Heat Rate * hp
Fuel consumption	11.89	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	104.2	MMscf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Mfg. data*
CO	3.04	g/hp-hr	*Mfg. data*
NMNEHC (VOC)	0.45	g/hp-hr	*Mfg. data*
Formaldehyde	0.28	g/hp-hr	*Mfg. data*
CO_2	531	g/hp-hr	*Mfg. data*
CH_4	3.87	g/hp-hr	*Mfg. data (THC - NMHC)*

Exhaust Parameters

Exhaust temp	952	deg F	*Mfg data*
Stack diameter	1.00	ft	*Provided by Client*
Stack height	21	ft	*Provided by client*
Exhaust flow	9,320	acfm	*Catalyst data*
Stack velocity	197.8	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
1.5	9.0	1.3	0.17	0.12	0.8	0.9	0.01475	0.05007	0.00039	0.00016	0.00062	0.00397	0.00180	1,569	240	0.003	lb/hr
6.5	39.3	5.8	0.74	0.54	3.6	4.0	0.06460	0.21930	0.00170	0.00070	0.00270	0.01740	0.00790	6,871	1,052	0.012	tpy
														6,233	954	0.011	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	87%	47%			80%												Nominal % reduction[6]
1.5	1.17	0.70	0.17	0.12	0.17	0.24	0.015	0.050	0.000	0.000	0.001	0.004	0.002	1,569	240	0.003	lb/hr
6.47	5.11	3.09	0.74	0.54	0.72	1.14	0.065	0.219	0.002	0.001	0.003	0.017	0.008	6,871	1,052	0.012	tpy
														6,233	954	0.011	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Caterpillar G3520B

Emission Units:	17-0533
Source Description:	Natural gas engine
Manufacturer:	Caterpillar
Model:	G3520B
Type	4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	1725	hp	*Mfg data*
Heat Rate	8195	Btu/hp-hr	*Mfg data, HHV*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	14.14	MMBtu/hr	Heat Rate * hp
Fuel consumption	13.53	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	118.5	MMscf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Mfg. data*
CO	2.32	g/hp-hr	*Mfg. data*
NMNEHC (VOC)	0.54	g/hp-hr	*Mfg. data*
Formaldehyde	0.45	g/hp-hr	*Mfg. data*
CO_2	456	g/hp-hr	*Mfg. data*
CH_4	4.59	g/hp-hr	*Mfg. data (THC - NMHC)*

Exhaust Parameters

Exhaust temp	981	deg F	*Mfg data*
Stack diameter	1.33	ft	*Provided byt Client*
Stack height	21	ft	*Provided byt Client*
Exhaust flow	8,919	acfm	*Catalyst data*
Stack velocity	106.5	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
1.9	8.8	2.1	0.19	0.14	1.7	1.8	0.0190	0.0645	0.0005	0.0002	0.0008	0.0051	0.0023	1,734	367	0.003	lb/hr
8.3	38.6	9.0	0.85	0.62	7.5	8.0	0.0832	0.2823	0.0022	0.0008	0.0034	0.0224	0.0101	7,596	1,606	0.014	tpy
														6,891	1457	0.012	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	90%	50%			80%												Nominal % reduction[6]
1.9	0.88	1.03	0.19	0.14	0.34	0.43	0.0190	0.0645	0.0005	0.0002	0.0008	0.0051	0.0023	1,734	367	0.003	lb/hr
8.33	3.86	4.50	0.85	0.62	1.50	2.04	0.0832	0.2823	0.0022	0.0008	0.0034	0.0224	0.0101	7,596	1,606	0.014	tpy
														6,891	1,457	0.012	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Lucid Energy Delaware - Frac Cat Compressor Station

Caterpillar G3606 A3

Emission Units:	17-0585
Source Description:	Natural gas engine
Manufacturer:	Caterpillar
Model:	G3606 A3
Type	4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	1775	hp	*Mfg data*
Heat Rate	7610	Btu/hp-hr	*Mfg data*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	13.51	MMBtu/hr	Heat Rate * hp
Fuel consumption	12.93	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	113.2	MMcf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Catalyst data*
CO	2.75	g/hp-hr	*Catalyst data*
NMNEHC (VOC)	0.95	g/hp-hr	*Catalyst data*
Formaldehyde	0.40	g/hp-hr	*Catalyst data*
CO_2	442	g/hp-hr	*Mfg. data*
CH_4	5.36	g/hp-hr	*Mfg. data*

Exhaust Parameters

Exhaust temp	847	deg C	*Mfg data*
Stack diameter	1.50	ft	*Provided by Client*
Stack height	21	ft	*Provided by Client*
Exhaust flow	12,146	acfm	*Catalyst data*
Stack velocity	114.6	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
2.0	10.8	3.7	0.18	0.13	1.6	1.7	0.020	0.066	0.001	0.000	0.001	0.053	0.002	1,730	440	0.003	lb/hr
8.6	47.1	16.3	0.81	0.59	6.9	7.4	0.09	0.29	0.00	0.00	0.00	0.23	0.01	7,576	1,929	0.013	tpy
														6,873	1750	0.012	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	82%	80%			95%												Nominal % reduction[6]
2.0	1.96	0.74	0.18	0.13	0.08	0.22	0.020	0.066	0.001	0.000	0.001	0.053	0.002	1,730	440	0.003	lb/hr
8.57	8.58	3.22	0.81	0.59	0.34	0.90	0.086	0.291	0.002	0.001	0.004	0.231	0.010	7,576	1,929	0.013	tpy
														6,873	1,750	0.012	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Lucid Energy Delaware - Frac Cat Compressor Station

Caterpillar G3606 A4

Emission Units:	3, 4
Source Description:	Natural gas engine
Manufacturer:	Caterpillar
Model:	G3606
Type	4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	1875	hp	*Mfg data*
Heat Rate	7562	Btu/hp-hr	*Mfg data, HHV*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	14.18	MMBtu/hr	Heat Rate * hp
Fuel consumption	13.57	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	118.9	MMscf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Catalyst data*
CO	2.20	g/hp-hr	*Catalyst data*
NMNEHC (VOC)	0.29	g/hp-hr	*Catalyst data*
Formaldehyde	0.20	g/hp-hr	*Catalyst data*
CO_2	433	g/hp-hr	*Mfg. data*
CH_4	4.17	g/hp-hr	*Mfg. data (THC - NMHC)*

Exhaust Parameters

Exhaust temp	835	deg F	*Mfg data*
Stack diameter	1.50	ft	*Provided by Client*
Stack height	23	ft	*Provided by Client*
Exhaust flow	11,819	acfm	*Catalyst data*
Stack velocity	111.5	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
2.1	9.1	1.2	0.19	0.14	0.8	0.9	0.021	0.070	0.001	0.000	0.001	0.006	0.003	1,790	362	0.003	lb/hr
9.1	39.8	5.3	0.85	0.62	3.6	4.2	0.09	0.31	0.00	0.00	0.00	0.02	0.011	7,840	1,585	0.014	tpy
														7,112	1438	0.012	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	85%	40%			80%												Nominal % reduction[6]
2.1	1.36	0.72	0.19	0.14	0.17	0.26	0.021	0.070	0.001	0.000	0.001	0.006	0.003	1,790	362	0.003	lb/hr
9.05	5.97	3.15	0.85	0.62	0.72	1.31	0.090	0.307	0.002	0.001	0.004	0.024	0.011	7,840	1,585	0.014	tpy
														7,112	1,438	0.012	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Lucid Energy Delaware - Frac Cat Compressor Station

Caterpillar G3608

Emission Units:	5
Source Description:	Natural gas engine
Manufacturer:	Caterpillar
Model:	G3608
Type	4-stroke, lean burn natural gas engine

	Maximum Rating 100%		
Rated hp	2500	hp	*Mfg data*
Heat Rate	7487	Btu/hp-hr	*Mfg data, HHV*
Fuel heat value	1045	Btu/scf	Nominal pipeline natural gas, HHV
Heat Input	18.72	MMBtu/hr	Heat Rate * hp
Fuel consumption	17.91	Mscf/hr	Heat input / fuel heat value
Annual fuel usage	156.9	MMscf/yr	8760 hrs/yr operation
NOx	0.50	g/hp-hr	*Mfg. data*
CO	2.23	g/hp-hr	*Mfg. data*
NMNEHC (VOC)	0.26	g/hp-hr	*Mfg. data*
Formaldehyde	0.23	g/hp-hr	*Mfg. data*
CO_2	429	g/hp-hr	*Mfg. data*
CH_4	3.52	g/hp-hr	*Mfg. data*

Exhaust Parameters

Exhaust temp	851	deg F	*Mfg data*
Stack diameter	1.50	ft	*Provided by Client*
Stack height	23	ft	*Provided by Client*
Exhaust flow	15,959	acfm	*Catalyst data*
Stack velocity	150.5	ft/s	*Exhaust flow / stack area*

Emission Calculations

Maximum Uncontrolled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
			0.014	1.0E-02												0.00022	lb/MMBtu
2.8	12.3	1.4	0.26	0.19	1.3	1.4	0.02753	0.09340	0.00073	0.00027	0.00112	0.00742	0.00333	2,364	407	0.004	lb/hr
12.1	53.8	6.3	1.12	0.82	5.6	6.3	0.12060	0.40910	0.00320	0.00120	0.00490	0.03250	0.01460	10,356	1,784	0.018	tpy
														9,395	1619	0.016	tonnes/yr

Maximum Controlled Emissions

NOx[3]	CO[3]	VOC[3]	SO_2[1]	PM[2]	HCHO[3]	HAPs[4]	Acetaldehyde[4]	Acrolein[4]	Ethylbenzene[4]	n-Hexane[4]	Benzene[4]	Toluene[4]	Xylene[4]	CO_2[3]	CH_4 as CO_2e[3]	N_2O as CO_2e[5]	
	82%	48%			75%												Nominal % reduction[6]
2.8	2.21	0.75	0.26	0.19	0.32	0.45	0.0275	0.0934	0.0007	0.0003	0.0011	0.0074	0.0033	2,364	407	0.004	lb/hr
12.07	9.69	3.26	1.12	0.82	1.39	2.17	0.1206	0.4091	0.0032	0.0012	0.0049	0.0325	0.0146	10,356	1,784	0.018	tpy
														9,395	1,619	0.016	tonnes/yr

[1] *Based on 5 gr / 100 scf, nominal pipeline natural gas fuel*

[2] *PM = TSP = PM_{10} = $PM_{2.5}$; AP-42, 3.2-2 (07/00)*

[3] *Emission factors are based on 100% load.*

[4] *All HAP emissions rates other than HCHO were referenced from GRI HAPCalc 3.01.*

[5] 40 CFR 98 Table C-2 Emission Factor for N_2O: 1E-04 (kg/mmBtu) ≡ 2.2046E-04 lb/MMBtu

[6] *Based on Powertherm catalyst data*

Lucid Energy Delaware - Frac Cat Compressor Station

Glycol Dehydrator

Unit: Dehy-1 & 2
Description: Glycol Dehydrator
Control Equipment: BTEX Condenser and Reboiler

Uncontrolled Emissions [1]

	VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Dehy-1	153.35	671.69	0.0027	0.012	17.09	74.83	21.12	92.50	94.28	412.96	0.74	3.23	9.33	40.88	30.18	132.20	8.11	35.53	45.92	201.13
Dehy-2	153.35	671.69	0.0027	0.012	17.09	74.83	21.12	92.50	94.28	412.96	0.74	3.23	9.33	40.88	30.18	132.20	8.11	35.53	45.92	201.13

Controlled Emissions [2]

VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Emissions are controlled by the BTEX condenser and the reboiler. These emissions are accounted for under the reboiler.																			

Notes

[1] Emissions are calculated using BR&E ProMax and include the uncontrolled regenerator emissions and the flash tank overhead emissions.

[2] Flash tank off gas emissions are recycled and recompressed. Regenerator emissions are controlled by a BTEX condenser and the reboiler.

Lucid Energy Delaware - Frac Cat Compressor Station

Amine Unit

Unit: Amine -1
Description: Amine Unit
Control Equipment: Process Flare

Uncontrolled Emissions [1]

	VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Vent Gas Emissions	37.26	163.22	0.4964	2.174	91.11	399.04	12613.65	55247.81	15.53	68.01	0.06	0.27	4.21	18.42	6.14	26.91	0.64	2.79	4.48	19.62

Controlled Emissions [2]

VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Emissions are controlled by the process flare. These emissions are accounted for under unit Flare-1.																			

Notes
[1] Emissions are calculated using BR&E ProMax and include the uncontrolled condenser emissions (acid gas) and the flash tank emissions (flash gas). These streams are combined to output the vent gas stream, which is controlled by the flare.

Lucid Energy Delaware - Frac Cat Compressor Station

Process Flare - Amine Unit

Emission Unit: Flare-1

Fuel Data

Flare Pilot	195	scf/hr	Max design
	1.95E-04	MMscf/hr	
	1045.00	Btu/scf	Fuel Gas, HHV
	0.2038	MMBtu/hr	
Assist Gas			
	34.95	Btu/scf	Heating value of Pilot + Flared gas
	200.0	Btu/scf	target heat content
	1,045.0	Btu/scf	Assist gas (Fuel Gas)
	0.0235	MMscf/hr	Assist gas volume
	24.6	MMBtu/hr	Assist gas heat input
Assist gas - Annual	206.2	MMscf/yr	Estimated Maximum annual flow rate. Not a requested limit; for calculation only.
Flared Gas - Short Term [1]	0.12	MMscf/hr	Effective hourly flowrate
	33.32	Btu/scf	ProMax
	4.02	MMBtu/hr	Hourly heat rate = Heating value * Effective hourly flow rate.
Flared Gas - Annual [1]	1,055.83	MMscf/yr	Estimated Maximum annual flow rate. Not a requested limit; for calculation only.
Total	**28.8**	**MMBtu/hr**	**Pilot + Flared gas + Assist gas**

Ratio for assist gas/flared gas fuel usage		
	MMscf/hr	Ratio
Assist gas	0.0235	0.1634
Flared gas	0.121	0.8366
	0.144	1.0000

Hours of flaring per year = 8760

Note: [1] Flared gas is Unit Amine-1 vent gas

Emission Rates

Pilot

NOx	CO	VOC	H_2S	SO_2	Total HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Units	
0.0680	0.3100										lb/MMBtu	AP-42 Tables 13.5-1 and 13.5-2
			3.57E-04								lb H_2S/Mscf	Purchased sweet natural gas fuel, 0.25 gr H_2S/100scf
			6.96E-05								lb H_2S/hr	H_2S rate * fuel usage
				7.14E-03							lb S/Mscf	Purchased sweet natural gas fuel, 5 gr S/100scf
				1.39E-03							lb SO_2/hr	SO_2 rate * fuel usage
		0.00%			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	mol%	Assumed content in purchased fuel (methane)
100%	100%		100%	100%							%	Safety Factor
0.1360	0.6200										lb/MMBtu	Unit emission rate with Safety Factor
0.028	**0.126**										lb/hr	lb/MMBtu * MMBtu/hr
		-	**2.8E-06**	**2.8E-03**	-	-	-	-	-	-	lb/hr	98% combustion H_2S; 100% conversion to SO_2
0.121	**0.553**	-	**1.2E-05**	**1.2E-02**	-	-	-	-	-	-	tpy	8760 hrs/yr

Assist gas

NOx	CO	VOC	H_2S	SO_2	Total HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Units	
0.0680	0.3100										lb/MMBtu	AP-42 Tables 13.5-1 and 13.5-2
			3.57E-04								lb H_2S/Mscf	Purchased sweet natural gas fuel, 0.25 gr H_2S/100scf
			8.41E-03								lb H_2S/hr	H_2S rate * fuel usage
				7.14E-03							lb S/Mscf	Purchased sweet natural gas fuel, 5 gr S/100scf
				1.68E-01							lb SO_2/hr	SO_2 rate * fuel usage
		0.00%			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	mol%	Assumed content in purchased fuel (methane)
1.67	**7.63**										lb/hr	lb/MMBtu * MMBtu/hr
		-	**1.7E-04**	**0.168**	-	-	-	-	-	-	lb/hr	98% combustion H_2S; 100% conversion to SO_2
7.33	**33.40**	-	**7.37E-04**	**0.74**	-	-	-	-	-	-	tpy	

Flared Gas [1]

NOx	CO	VOC	H_2S	SO_2	Total HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Units	
0.0680	0.3100										lb/MMBtu	AP-42 Tables 13.5-1 and 13.5-2
		37.3	0.5		15.53	4.21	6.14	0.64	4.48	0.062	lb/hr	ProMax
0.27	1.24										lb/hr	lb/MMBtu * MMBtu/hr
0.27	**1.24**	**0.75**	**0.0**	**0.9**	**0.31**	**0.084**	**0.12**	**0.013**	**0.090**	**0.0012**	**lb/hr**	98% combustion H_2S; 100% conversion to SO_2
1.196	**5.45**	**3.264**	**0.04**	**4.1**	**1.36**	**0.37**	**0.54**	**0.056**	**0.39**	**0.0054**	**tpy**	

Acid Gas Flare	NOx	CO	VOC	H_2S	SO_2	Total HAP	Benzene	Toluene	Ethylbenzene	Xylenes	n-Hexane	Units
Pilot + Flared + Assist Gas	**1.97**	**9.00**	**0.75**	**0.010**	**1.11**	**0.31**	**0.084**	**0.12**	**0.013**	**0.090**	**0.0012**	lb/hr
	8.64	**39.41**	**3.264**	**0.044**	**4.84**	**1.36**	**0.37**	**0.54**	**0.056**	**0.39**	**0.0054**	tpy

Lucid Energy Delaware - Frac Cat Compressor Station

Process Flare Greenhouse Gas Emissions

Emission Unit: Flare-1
Source Description: Pilot Gas, Assist Gas, Amine Gas

§98.233(n) Flare stack GHG emissions.

Step 1. Calculate contribution of un-combusted CH_4 emissions from the flare combustion gas vent (actual conditions).

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from flare in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98

For gas sent to an unlit flare, η is zero.

X_{CH4} = Mole fraction of CH_4 in gas to the flare = 0.586 (Gas analysis)

Step 2. Calculate contribution of un-combusted CO_2 emissions from the flare combustion gas vent (actual conditions).

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from flare in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

X_{CO2} = Mole fraction of CO_2 in gas to the flare = 0.321

Step 3. Calculate contribution of combusted CO_2 emissions from the flare combustion gas vent (actual conditions).

$E_{a,CO2}$ (combusted) = ∑ (η * V_a * Y_i * R_i) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98

For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_i = mole fraction of gas hydrocarbon constituents j:

Constituent j, Methane =	0.586
Constituent j, Ethane =	0.0459
Constituent j, Propane =	0.0022
Constituent j, Butane =	0.00018
Constituent j, Pentanes =	0.00011
Constituent j, Hexane Plus =	0.00012

R_i = number of carbon atoms in the gas hydrocarbon constituent j:

Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes =	5
Constituent j, Hexane Plus =	6

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s}$$ *(Equation W-33)*

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) = 60 F

T_a = Temperature at actual conditions (F) = 76 F (Annual Avg Max Temperature for Midland, TX from Western Regional Climate Center)

P_s = Absolute pressure at standard conditions (psia) = 12.73 psia

P_a = Absolute pressure at actual conditions (psia) = 13.28 psia Pressure in Midland, TX from TANKS 4.0.9d

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i} = E_{s,i} * \rho_i * 0.0011023$ *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4: 0.0192 kg/ft^3 (at 60F and 14.7 psia)

CO_2: 0.0526 kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40.

$Mass_{N2O} = 0.0011023 * Fuel * HHV * EF$ *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Field gas HHV = 1.045E-03 MMBtu/scf (Default provided in Subpart W Final Amendment;)

EF = 1.00E-04 kg N_2O/MMBtu

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare (regenerator) by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare (scf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted , $E_{a,CH4}$ (tpy)	CO_2 Un-Combusted, $E_{a,CO2}$ (tpy)	CO_2 Combusted, $E_{a,CO2}$ (tpy)	N_2O Mass Emissions (tpy)
1,262,264,779	14789001	404,902,708	848,949,280	313.00	23,476.656	49,222.91	1.5E-01

Step 8. Calculate CO_2 equivalent[1]

$CO_2e = CO_2 + \{CH_4 \text{ X GWP}\} + \{N_2O \text{ X GWP}\}$

CO_2e = 72,699.57 + 7,824.9196 + 43.32942

CO_2e = 80,567.82 tons/year

[1] Global Warming Potentials (GWP) are from Table A-1 of the EPA GHG MRR under 40 CFR Part 98.

CH_4 GWP = 25

N_2O GWP = 298

Lucid Energy Delaware - Frac Cat Compressor Station

Reboiler

Unit: RBL-1
Description: Dehy contactor, reboiler, Jatco BTEX condenser
Reboiler Portion 0.75 MMBtu/hr Glycol Dehydrator Reboiler
Dehy Portion Glycol Dehydrator (Still Vent)

Control Equipment: Dehydrator Condenser Control

Reboiler Fuel Usage

Fuel Consumption	0.75	MMBtu/hr	Input heat rate	
Fuel heat value	1045	Btu/scf	Frac Cat Fuel Analysis	
Hourly fuel usage	0.72	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	17.22	Mscf/d	Throughput	
Annual fuel usage	6.29	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Controlled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & Reboiler

Flow to Reboiler	173	scf/hr	ProMax- condenser vent gas stream
	0	scf/hr	Flash Tank off gas (routed to low pressure inlet)
	0.17	Mscf/hr	Total potential fuel routed to Reboiler (condenser vent gas)
	1474.7	btu/scf	Heating Value of Dehy Stream

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler)	102.5	86.1	5.6			7.8	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.074	**0.062**	**0.0040**	**0.010**	**2.87E-04**	**0.0056**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	0.32	**0.27**	**0.018**	**0.045**	**0.0013**	**0.024**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
	144.6	121.4	-	-	-	11.0	lb/MMscf	Adjusted emission factor: EFF X (Dehy Stream Heat Value/1,020 Btu/scf)
Dehydrator	0.025	0.021	0.43	0.0025	6.94E-05	0.0019	lb/hr	ProMax condenser overhead emissions (controlled to 95%)
(DEHY-Vent)[2]	-	-	-	-	-	-	lb/hr	Flash gas emissions[3]
	0.025	**0.021**	**0.43**	**0.002**	**0.000**	**0.002**	**lb/hr**	**Dehy-Vent Total**
	0.11	**0.09**	**1.88**	**0.01**	**0.0003**	**0.0083**	**tpy**	
Requested Limits	**0.10**	**0.08**	**0.4**	**0.013**	**3.56E-04**	**0.0075**	**lb/hr**	**Dehy-Vent and**
	0.43	**0.36**	**1.90**	**0.056**	**0.0016**	**0.033**	**tpy**	**Reboiler Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	m-Xylene	HCHO	Total HAPs[4]		
	1.80	**0.0021**	**0.0034**	**-**	**-**	**0.075**		lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming
	1.84	0.0022	0.0035	-	-	0.077		lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
Reboiler (DEHY-Reboiler)	**0.0013**	**1.54E-06**	**2.50E-06**	**-**	**-**	**5.51E-05**	**0.011**	**lb/hr**	Reboiler Emissions
	0.0058	**6.76E-06**	**1.10E-05**	**-**	**-**	**2.42E-04**	**0.047**	**tpy**	
	0.0026	**0.023**	**0.024**	**0.0020**	**-**	**-**	**0.05**	lb/hr	ProMax condenser overhead emissions (controlled to 95%)
Dehydrator	**-**	**-**	**-**	**-**	**-**	**-**	**-**	lb/hr	Flash gas emissions[3]
(DEHY-Vent)	**0.0026**	**0.0233**	**0.0241**	**0.0020**	**-**	**-**	**0.05**	**lb/hr**	Emission rate without safety factor
	0.011	**0.10**	**0.11**	**0.009**	**-**	**-**	**0.23**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
Requested Limits	**0.0039**	**0.023**	**0.024**	**0.0020**	**-**	**0.000055**	**0.06**	**lb/hr**	**Dehy-Vent and**
	0.017	**0.10**	**0.11**	**0.009**	**-**	**0.00024**	**0.28**	**tpy**	**Reboiler Total**

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel
0.0004 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] Flow to the Reboiler is burned as fuel.

[3] Flash Gas is sent back to low pressure inlet.

[4] Reboiler Total HAPs are referenced from GRI HAP Calc 3.0.1

GHG Calculations

		CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
		53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
Reboiler		1	298	25		GWP	40 CFR 98 Table A-1
(DEHY-Reboiler)		*384.3*	*0.0007*	*0.007*		tpy	Reboiler
		384.3	**0.22**	**0.18**	**384.7**	tpy CO_2e	
		29.4		3.452		tpy	ProMax (controlled regenerator emissions)
		0.0		0.00		tpy	ProMax (flash gas emissions)
Dehydrator		*29.39*		*3.45*		tpy	ProMax (controlled regenerator emissions+flash tank off gas)
(DEHY-Vent)		***29.39***	***0.00***	***3.45***		tpy	Total
		29.4	**0.0**	**86.3**	**115.7**	tpy CO_2e	
	Total	413.7	0.2	86.5	500.3	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Lucid Energy Delaware - Frac Cat Compressor Station

Reboiler

Unit:	RBL-2
Description:	Dehy contactor, reboiler, Jatco BTEX condenser
Reboiler Portion	1.25 MMBtu/hr Glycol Dehydrator Reboiler
Dehy Portion	Glycol Dehydrator (Still Vent)
Control Equipment:	Dehydrator Condenser Control

Reboiler Fuel Usage

Fuel Consumption	1.25	MMBtu/hr	Input heat rate	
Fuel heat value	1045	Btu/scf	Frac Cat Fuel Analysis	
Hourly fuel usage	1.20	Mscf/hr	Fuel usage	Fuel Usage (MMBtu/hr) * (10^6 Btu/MMBtu) / Fuel LHV (Btu/scf) * (Mscf/1000 scf)
Fuel Throughput	28.71	Mscf/d	Throughput	
Annual fuel usage	10.48	MMscf/yr	Annual usage	
Operating hours	8760.00	hr/yr		

Controlled Emissions - Glycol Dehydrator with Condenser (on Regenerator) & Reboiler

Flow to Reboiler	173	scf/hr	ProMax- condenser vent gas stream
	0	scf/hr	Flash Tank off gas (routed to low pressure inlet)
	0.17	Mscf/hr	Total potential fuel routed to Reboiler (condenser vent gas)
	1474.7	btu/scf	Heating Value of Dehy Stream

	NO_x	CO	VOC	SO_2[1]	H_2S[1]	TSP		
	100	84	5.5			7.6	lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming average NG heating value of 1,020 Btu/scf)
Reboiler (DEHY-Reboiler)	102.5	86.1	5.6			7.8	lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
	0.123	**0.103**	**0.0067**	**0.017**	**4.78E-04**	**0.0093**	**lb/hr**	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
	0.54	**0.45**	**0.030**	**0.075**	**0.0021**	**0.041**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
	144.6	121.4	-	-	-	11.0	lb/MMscf	Adjusted emission factor: EFF X (Dehy Stream Heat Value/1,020 Btu/scf)
Dehydrator	0.025	0.021	0.43	0.0025	6.94E-05	0.0019	lb/hr	ProMax condenser overhead emissions (controlled to 95%)
(DEHY-Vent)[2]	-	-	-	-	-	-	lb/hr	Flash gas emissions[3]
	0.025	**0.021**	**0.43**	**0.002**	**0.000**	**0.002**	**lb/hr**	**Dehy-Vent Total**
	0.11	**0.09**	**1.88**	**0.01**	**0.0003**	**0.0083**	**tpy**	
Requested Limits	**0.15**	**0.12**	**0.4**	**0.020**	**5.48E-04**	**0.0112**	**lb/hr**	**Dehy-Vent and**
	0.65	**0.54**	**1.91**	**0.086**	**0.0024**	**0.049**	**tpy**	**Reboiler Total**

	n-Hexane	Benzene	Toluene	Ethylbenzene	m-Xylene	HCHO	Total HAPs[4]		
	1.80	**0.0021**	**0.0034**	**-**	**-**	**0.075**		lb/MMscf	Unit emission rates from AP-42 Table 1.4-1 & 2 (Assuming
	1.84	0.0022	0.0035	-	-	0.077		lb/MMscf	Adjusted emission factor: EFF X (Fuel Heat Value/1,020 Btu/scf)
Reboiler (DEHY-Reboiler)	**0.0022**	**2.57E-06**	**4.17E-06**	**-**	**-**	**9.19E-05**	**0.018**	**lb/hr**	Reboiler Emissions
	0.0097	**1.13E-05**	**1.83E-05**	**-**	**-**	**4.03E-04**	**0.079**	**tpy**	
	0.0026	**0.023**	**0.024**	**0.0020**	**-**	**-**	**0.05**	lb/hr	ProMax condenser overhead emissions (controlled to 95%)
Dehydrator	**-**	**-**	**-**	**-**	**-**	**-**	**-**	lb/hr	Flash gas emissions[3]
(DEHY-Vent)	**0.0026**	**0.0233**	**0.0241**	**0.0020**	**-**	**-**	**0.05**	**lb/hr**	Emission rate without safety factor
	0.011	**0.10**	**0.11**	**0.009**	**-**	**-**	**0.23**	**tpy**	lb/hr * 8760 hrs/yr / 2000 lb/ton
Requested Limits	**0.0048**	**0.023**	**0.024**	**0.0020**	**-**	**0.000092**	**0.07**	**lb/hr**	**Dehy-Vent and**
	0.021	**0.10**	**0.11**	**0.009**	**-**	**0.00040**	**0.31**	**tpy**	**Reboiler Total**

[1] SO_2 emissions based on fuel sulfur content of 5 gr S/100 scf, or 0.00714 lb S/Mscf
0.00714 lb S/Mscf * fuel consumption (Mscf/hr) * 64 lb SO_2/32 lb S = lb SO2/hr
H_2S emissions based on 0.25 g H2S/100 scf, or 0.0004 lb H2S/Mscf in fuel
0.0004 lb H2S/Mscf fuel * fuel consumption (Mscf/hr) = lb H2S/hr

[2] Flow to the Reboiler is burned as fuel.

[3] Flash Gas is sent back to low pressure inlet.

[4] Reboiler Total HAPs are referenced from GRI HAP Calc 3.0.1

GHG Calculations

	CO_2[3]	N_2O[3]	CH_4[3]	CO_2e[3]		
	53.06	0.0001	0.001		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
Reboiler	1	298	25		GWP	40 CFR 98 Table A-1
(DEHY-Reboiler)	*640.4*	*0.0012*	*0.012*		tpy	Reboiler
	640.4	**0.36**	**0.30**	**641.1**	tpy CO_2e	
	29.4		3.452		tpy	ProMax (controlled regenerator emissions)
	0.0		0.00		tpy	ProMax (flash gas emissions)
Dehydrator	*29.39*		*3.45*		tpy	ProMax (controlled regenerator emissions+flash tank off gas)
(DEHY-Vent)	***29.39***	***0.00***	***3.45***		tpy	Total
	29.4	**0.0**	**86.3**	**115.7**	tpy CO_2e	
Total	669.8	0.4	86.6	756.8	tpy CO_2e	

[3] N_2O, CH_4, and CO_2 tpy Emission Rate= EF* Fuel Usage * Fuel Heat Value * 2.20462 lb/1 kg * 1 ton/2000 lb
CO_2e tpy Emission Rate = CO_2 Emission Rate + N_2O Emission Rate*GWP Factor +CH_4 Emission Rate*GWP Factor

Lucid Energy Delaware - Frac Cat Compressor Station

Reboiler

Reboiler Input Information			
Unit(s):	RBL-3		
Description:	21 MMbtu/hr heater		
Heat input:	21	MMBtu/hr	Estimated heat input
Fuel heat value:	1,045	Btu/scf	Fuel Gas Analysis
Fuel sulfur content:	5	gr/100scf	Estimated for sweet field gas
Operating hours:	8760	hours/year	
Fuel Usage:	20095.7	scf/hr	

Emission Calculations per Unit													
	NO_x	CO	VOC	SO_2[1]	PM^2	$HCHO^3$	Total $HAPs^3$	CO_2	CH_4	N_2O	CO_2e^4	Unit	Notes
Emission Factors	100	84	5.5		7.6							lb/MMscf	AP-42 Table 1.4-1 & 2
	102.5	86.1	5.6		7.8							lb/MMscf	Adjusted EF, per footnote a in Tables 1.4-1 and 1.4-2
								53.0	0.0010	0.00010		kg/MMBtu	Table C-1 and C-2 of 40 CFR 98 Subpart C
								116.6	0.0022	0.00022		lb/MMBtu	
Emissions	2.059	1.729	0.113		0.1565			2449.52	0.0462	0.0046		lb/hr[5]	
												tons/year[6]	
Total Emissions	2.06	1.73	0.11	0.0718	0.16	0.018	0.30	2449.52	0.0462	0.00462	2452.06	lb/hr	
	9.02	7.57	0.50	0.314	0.69	0.078	1.33	10728.92	0.2024	0.02024	10740.00	tons/year	

[1] SO_2 lb/hr = Sulfur (gr/100scf) * 1lb/7000gr * Rating (MMBtu/hr)*10^6 (Btu/MMBtu) / Heat value (Btu/scf) * 64/32

[2] Assumes TSP = PM_{10} = $PM_{2.5}$

[3] HAP annual emission rate calculated using GRI-HAPCalc 3.01

[4] Global Warming Potentials (GWP) are from Table A-1 of the EPA GHG MRR under 40 CFR Part 98.

CH_4 GWP = 25

N_2O GWP = 298

[5] lb/hr emissions calculated using the following methods:

NO_x, CO, VOC and PM lb/hr = EF (lb/MMscf) * Rating (MMBtu/hr) / Heat value (Btu/scf)

GHGs = EF(lb/MMBtu) * Rating *(MMBtu/hr)

[6] For all non-HAP calculations, tons/year = lb/hr * Operating hours * 1ton/2000lb

Facility Fugitives

Unit: FUG
Description: Facility Fugitive Emissions
Control Equipment: N/A

COMPONENT TYPE	CURRENT COUNT [1]	EPA[2] FACTOR (lb/hr-src)	REDUCTION ALLOWED FOR LDAR	% VOC IN STREAM[3]	VOC EMISSIONS (lb/hr)	VOC EMISSIONS (tpy)	% H_2S IN STREAM[3]	H_2S EMISSIONS (lb/hr)	H_2S EMISSIONS (tpy)	% CH6 IN STREAM[3]	% CH6 EMISSIONS (lb/hr)	% CH6 EMISSIONS (tpy)	% HAP IN STREAM[3]	% HAP EMISSIONS (lb/hr)	% HAP EMISSIONS (tpy)	% CO2 IN STREAM[3]	% CO2 EMISSIONS (tpy)	% CH4 IN STREAM[3]	% CH4 EMISSIONS (tpy)
Inlet Gas (gas)																			
VALVES	610	9.9E-03	0%	18.3%	1.11	4.84	0.0007%	4.4E-05	1.9E-04	0.00%	0.0E+00	0.0E+00	1.59%	9.6E-02	4.2E-01	18.83%	5.0E+00	47.63%	1.3E+01
FLANGES	88	8.6E-04	0%	18.3%	0.014	0.06	0.0007%	5.4E-07	2.4E-06	0.00%	0.0E+00	0.0E+00	1.59%	1.2E-03	5.3E-03	18.83%	6.2E-02	47.63%	1.6E-01
CONNECTORS	1782	4.4E-04	0%	18.3%	0.143	0.627	0.0007%	5.7E-06	2.5E-05	0.00%	0.0E+00	0.0E+00	1.59%	1.2E-02	5.5E-02	18.83%	6.5E-01	47.63%	1.6E+00
Open-ended Line	37	4.4E-03	0%	18.3%	0.03	0.13	0.0007%	1.2E-06	5.2E-06	0.00%	0.0E+00	0.0E+00	1.59%	2.6E-03	1.1E-02	18.83%	1.3E-01	47.63%	3.4E-01
COMPRESSOR SEALS	0	1.9E-02	0%	18.3%	-	-	0.0007%	-	-	0.00%	-	-	1.59%	-	-	18.83%	-	47.63%	-
PUMP SEALS	0	5.3E-03	0%	18.3%	-	-	0.0007%	-	-	0.00%	-	-	1.59%	-	-	18.83%	-	47.63%	-
Condensate (light oil)																			
VALVES	338	5.5E-03	0%	27.0%	0.50	2.2	0.0001%	1.3E-06	5.5E-06	1.94%	3.6E-02	1.6E-01	20.42%	3.8E-01	1.7E+00	0.088%	7.2E-03	0.00%	3.2E-04
FLANGES	88	2.4E-04	0%	27.0%	5.8E-03	0.025	0.0001%	1.4E-08	6.3E-08	1.94%	4.1E-04	1.8E-03	20.42%	4.3E-03	1.9E-02	0.088%	8.2E-05	0.00%	3.6E-06
CONNECTORS	729	4.6E-04	0%	27.0%	9.1E-02	0.40	0.0001%	2.3E-07	1.0E-06	1.94%	6.5E-03	2.9E-02	20.42%	6.9E-02	3.0E-01	0.088%	1.3E-03	0.00%	5.7E-05
PUMP SEALS	5	2.9E-02	0%	27.0%	0.04	0.17	0.0001%	-	-	1.94%	-	-	20.42%	-	-	0.088%	-	0.00%	-
TOTAL EMISSIONS					1.93	8.46		5.27E-05	2.31E-04		4.29E-02	1.88E-01		5.66E-01	2.48E+00		5.84E+00		14.76

[1] Fugitive emission source counts were calculated based on the types of field equipment at the facility and a general source count per equipment.

[2] Factors are from Protocol for Equipment Leak Emission Estimates from the EPA (Table 2-4).

[3] VOC and H_2S concentrations are based on ProMax output.

Storage Tanks

Unit: T-1 through T-4
Description: Facility Tanks
Control Equipment: N/A

Tank Emissions

Uncontrolled Annual Emissions

		Throughput	W&B Losses		Flash Losses		VOC		H2S		HAP		Benzene		Toluene	
Unit	Tank Description	(gal/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
-	100 bbl Methanol [1, 2]	2,500	0.019	0.081	-	-	0.019	0.081	-	-	-	-	-	-	-	-
T-1	Condensate/Waste Oil [3]	251,348	0.014	0.060	0.056	0.25	0.070	0.31	1.39E-05	6.11E-05	0.0103	0.045	0.0038	0.017	0.0039	0.017
T-2	Condensate/Waste Oil [3]	251,348	0.014	0.060	0.056	0.25	0.070	0.31	1.39E-05	6.11E-05	0.0103	0.045	0.0038	0.017	0.0039	0.017
T-3	Condensate/Waste Oil [3]	251,348	0.014	0.060	0.056	0.25	0.070	0.31	1.39E-05	6.11E-05	0.0103	0.045	0.0038	0.017	0.0039	0.017
T-4	Condensate/Waste Oil [3]	251,348	0.014	0.060	0.056	0.25	0.070	0.31	1.39E-05	6.11E-05	0.0103	0.045	0.0038	0.017	0.0039	0.017

[1] Standing and working losses calculated using TANKS 4.0.9d.

[2] Methanol tank does not have flashing losses.

[3] ProMax was used to calculate emissions for the condensate tanks.

Lucid Energy Delaware - Frac Cat Compressor Station

Truck Loading Emissions

Unit: LOAD
Description: Condensate/ Oily Waste Water Loading Emissions
Control Equipment: N/A

	lb/hr	tpy
H2S	1.48E-05	6.50E-05
Nitrogen	3.69E-06	1.62E-05
Methane	1.07E-03	4.68E-03
Carbon Dioxide	5.35E-02	2.34E-01
Ethane	1.24E-02	5.43E-02
Propane	1.73E-02	7.59E-02
i-Butane	2.54E-03	1.11E-02
n-Butane	9.66E-03	4.23E-02
Isopentane	3.26E-03	1.43E-02
n-Pentane	3.58E-03	1.57E-02
2,2-Dimethylbutane	7.62E-06	3.34E-05
Cyclopentane	0.00E+00	0.00E+00
2-Methylpentane	2.24E-04	9.80E-04
3-Methylpentane	1.37E-04	6.01E-04
n-Hexane	2.39E-04	1.05E-03
Methylcyclopentane	5.83E-04	2.55E-03
Benzene	2.53E-03	1.11E-02
Cyclohexane	5.16E-04	2.26E-03
2-Methylhexane	6.02E-06	2.64E-05
3-Methylhexane	5.80E-05	2.54E-04
n-Heptane	1.19E-04	5.21E-04
Methylcyclohexane	2.59E-04	1.13E-03
Toluene	2.48E-03	1.09E-02
n-Octane	1.17E-04	5.11E-04
Ethylbenzene	2.29E-04	1.00E-03
p-Xylene	7.49E-04	3.28E-03
m-Xylene	1.40E-04	6.14E-04
o-Xylene	2.25E-04	9.87E-04
n-Nonane	2.82E-05	1.23E-04
C10	1.30E-05	5.69E-05
n-Undecane	8.79E-06	3.85E-05
MDEA	9.93E-10	4.35E-09
DEA	5.00E-14	2.19E-13
Water	2.23E-02	9.79E-02
TEG	5.82E-12	2.55E-11
VOC Total	**0.045**	**0.20**
HAP Total	**0.0066**	**0.029**
Hydrogen Sulfide Total	**1.48E-05**	**6.50E-05**

Lucid Energy Delaware - Frac Cat Compressor Station

Haul Road

Unit: HAUL
Description: Haul Road
Control Equipment: N/A

Input Data

Empty vehicle weight[1]	16	tons
Load weight[2]	29.8	tons
Loaded vehicle[3]	45.8	tons
Mean vehicle weight[4]	30.9	tons
Vehicle frequency	1.0	trips/hour
Round-trip distance	0.25	mile/trip
Vehicle miles traveled[5]	33.25	miles/yr
Operating hours	8760	hours/yr
Surface silt content[6]	4.8	%
Annual wet days[7]	70	days/yr
Vehicle miles traveled[8]	0.25	mile/hr
Control percentage	0.0%	nominal, base course chemical treatment

Emission Factors and Constants

Parameter	PM_{30}	PM_{10}	$PM_{2.5}$
k, lb/VMT[9]	4.9	1.5	0.15
a, lb/VMT[9]	0.70	0.90	0.90
b, lb/VMT[9]	0.45	0.45	0.45
Hourly EF, lb/VMT[10]	7.37	1.88	0.19
Annual EF, lb/VMT[11]	5.95	1.52	0.15

Uncontrolled Emissions

PM_{30}	PM_{10}	$PM_{2.5}$	
1.84	0.47	0.047	lb/hr[12]
0.064	0.016	0.0016	ton/yr[13]

Notes

[1] Empty vehicle weight includes driver and occupants and full fuel load.
[2] Cargo, transported materials, etc. (Liquid Density [lb/ft^3] * 0.13 [ft^3/gal] * 7560 [gal/truck] / 2000 [lb/ton])
[3] Loaded vehicle weight = Empty + Load Size
[4] Mean Vehicle weight = (Loaded Weight + Empty Weight) / 2
[5] VMT/yr = Daily Throughput [bbl/d]*42 [gal/bbl] *(1/7560) [truck/ gal]*[VMT/trip]*1 [trip/day]* 365 [days/year]
[6] AP-42 Table 13.2.2-1, Sand and gravel processing
[7] AP-42 Figure 13.2.2-1
[8] VMT/hr = Vehicle Miles Traveled per hour = Trips per hour * Segment Length
[9] Table 13.2.2-2, Industrial Roads
[10] AP-42 13.2.2, Equation 1a
[11] AP-42 13.2.2, Equation 2
[12] lb/hr = Hourly EF (lb/VMT) * VMT (mile/hr)
[13] ton/yr = Annual EF (lb/VMT) * Truck/day * Mile/truck * 365day/yr * 1ton/2000lb

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- ☒ If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☐ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- ☒ If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- ☐ If an older version of AP-42 is used, include a complete copy of the section.
- ☒ If an EPA document or other material is referenced, include a complete copy.
- ☒ Fuel specifications sheet.
- ☒ If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

Compressor Engines (Units 17-0585, 13-0104, 17-0590, 17-0529, 17-0530, 17-0533, 17-0534, 18-1279, 1, 2, 3, 4, and 5)
- AP-42 Table 3.2-2
- 40 CFR Part 98 Table C-1 and C-2
- Manufacturer Engine and Catalyst Specifications
- Fuel Gas Analysis
- GRI HAPCalc 3.01

Dehydrators (Units Dehy-1 and Dehy-2)
- BR&E ProMax
- Thistle Loop CDP Field Gas Analysis (dated 10/01/2018)
- Windward CDP Field Gas Analysis (dated 9/01/2018)

Glycol Dehydrator Reboilers (Units RBL-1 and RBL-2)
- AP-42 Table 1.4-1 and 1.4-2
- BR&E ProMax
- Thistle Loop CDP Field Gas Analysis (dated 10/01/2018)
- Windward CDP Field Gas Analysis (dated 9/01/2018)
- 40 CFR 98 Subparts A and C

Amine Unit Reboiler (Unit RBL-3)
- AP-42 Table 1.4-1 and 1.4-2

Amine Unit (Unit Amine-1)
- BR&E ProMax
- Frac Cat Compressor Station Gas Analysis (dated 10/9/2018)

Assist Gas Process Flare (Unit Flare-1)
- BR&E ProMax – Acid Gas Stream
- Emissions factors from AP-42 Tables 13.5-1 and 13.5-2
- Flare manufacturer specifications

Tanks (Units T-1, T-2, T-3, and T-4)
- BR&E ProMax
- Thistle Loop CDP Field Gas Analysis (dated 10/01/2018)
- Windward CDP Field Gas Analysis (dated 9/01/2018)

Condensate / Oily Waste Water Loading Emissions (LOAD)
- BR&E ProMax
- Thistle Loop CDP Field Gas Analysis (dated 10/01/2018)
- Windward CDP Field Gas Analysis (dated 9/01/2018)

Unpaved Haul Road Emissions (HAUL)
- Emissions factors from AP-42 Tables 13.2.2 Equations 1a and 2

Fugitive Emission (Unit FUG)
- Component counts from facility engineers
- Liquid and Gas analyses derived from a BR&E ProMax simulation
- Emissions factors referenced from the Protocol for Equipment Leak Emission Estimates from the EPA (Table 2-4).

Table 3.2-2. UNCONTROLLED EMISSION FACTORS FOR 4-STROKE LEAN-BURN ENGINES[a]
(SCC 2-02-002-54)

Pollutant	Emission Factor (lb/MMBtu)[b] (fuel input)	Emission Factor Rating
Criteria Pollutants and Greenhouse Gases		
NO_x[c] 90 - 105% Load	4.08 E+00	B
NO_x[c] <90% Load	8.47 E-01	B
CO[c] 90 - 105% Load	3.17 E-01	C
CO[c] <90% Load	5.57 E-01	B
CO_2[d]	1.10 E+02	A
SO_2[e]	5.88 E-04	A
TOC[f]	1.47 E+00	A
Methane[g]	1.25 E+00	C
VOC[h]	1.18 E-01	C
PM10 (filterable)[i]	7.71 E-05	D
PM2.5 (filterable)[i]	7.71 E-05	D
PM Condensable[j]	9.91 E-03	D
Trace Organic Compounds		
1,1,2,2-Tetrachloroethane[k]	<4.00 E-05	E
1,1,2-Trichloroethane[k]	<3.18 E-05	E
1,1-Dichloroethane	<2.36 E-05	E
1,2,3-Trimethylbenzene	2.30 E-05	D
1,2,4-Trimethylbenzene	1.43 E-05	C
1,2-Dichloroethane	<2.36 E-05	E
1,2-Dichloropropane	<2.69 E-05	E
1,3,5-Trimethylbenzene	3.38 E-05	D
1,3-Butadiene[k]	2.67E-04	D
1,3-Dichloropropene[k]	<2.64 E-05	E
2-Methylnaphthalene[k]	3.32 E-05	C
2,2,4-Trimethylpentane[k]	2.50 E-04	C
Acenaphthene[k]	1.25 E-06	C

[Amended at 75 FR page 79140, Dec. 17, 2010]

§ 98.31 Reporting threshold.

You must report GHG emissions under this subpart if your facility contains one or more stationary fuel combustion sources and the facility meets the applicability requirements of either §§98.2(a)(1), 98.2(a)(2), or 98.2(a)(3).

§ 98.32 GHGs to report.

You must report CO_2, CH_4, and N_2O mass emissions from each stationary fuel combustion unit, except as otherwise indicated in this subpart.

[75 FR page 79140, Dec. 17, 2010]

§ 98.33 Calculating GHG emissions.

You must calculate CO_2 emissions according to paragraph (a) of this section, and calculate CH_4 and N_2O emissions according to paragraph (c) of this section.

98.33(a) CO_2 emissions from fuel combustion.

Calculate CO_2 mass emissions by using one of the four calculation methodologies in paragraphs (a)(1) through (a)(4) of this section, subject to the applicable conditions, requirements, and restrictions set forth in paragraph (b) of this section. Alternatively, for units that meet the conditions of paragraph (a)(5) of this section, you may use CO_2 mass emissions calculation methods from part 75 of this chapter, as described in paragraph (a)(5) of this section. For units that combust both biomass and fossil fuels, you must calculate and report CO_2 emissions from the combustion of biomass separately using the methods in paragraph (e) of this section, except as otherwise provided in paragraphs (a)(5)(iv) and (e) of this section and in §98.36(d).

98.33(a)(1) Tier 1 Calculation Methodology.

Calculate the annual CO_2 mass emissions for each type of fuel by using Equation C-1, C-1a, or C-1b of this section (as applicable).

98.33(a)(1)(i)

Use Equation C-1 except when natural gas billing records are used to quantify fuel usage and gas consumption is expressed in units of therms or million Btu. In that case, use Equation C-1a or C-1b, as applicable.

$$CO_2 = 1x10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-1)}$$

Where:

CO_2 = Annual CO_2 mass emissions for the specific fuel type (metric tons).

Fuel = Mass or volume of fuel combusted per year, from company records as defined in §98.6 (express mass in short tons for solid fuel, volume in standard cubic feet for gaseous fuel, and volume in gallons for liquid fuel).

HHV = Default high heat value of the fuel, from Table C–1 of this subpart (mmBtu per mass or mmBtu per volume, as applicable).

EF = Fuel-specific default CO_2 emission factor, from Table C–1 of this subpart (kg CO_2/mmBtu).

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(a)(1)(ii)

If natural gas consumption is obtained from billing records and fuel usage is expressed in therms, use Equation C-1a.

$$CO_2 = 1x10^{-3}\left[0.1 * Gas * EF\right] \qquad \text{(Eq. C-1a)}$$

Where:

CO_2 = Annual CO_2 mass emissions from natural gas combustion (metric tons).

Gas = Annual natural gas usage, from billing records (therms).

EF = Fuel-specific default CO_2 emission factor for natural gas, from Table C-1 of this subpart (kg CO_2/mmBtu).

0.1 = Conversion factor from therms to mmBtu

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(a)(1)(iii)

If natural gas consumption is obtained from billing records and fuel usage is expressed in mmBtu, use Equation C-1b.

$$CO_2 = 1 x 10^{-3} * Gas * EF \qquad \text{(Eq. C-1b)}$$

Where:

CO_2 = Annual CO_2 mass emissions from natural gas combustion (metric tons).

Gas = Annual natural gas usage, from billing records (mmBtu).

EF = Fuel-specific default CO_2 emission factor for natural gas, from Table C-1 of this subpart (kg CO_2/mmBtu).

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(a)(2) Tier 2 Calculation Methodology.

Calculate the annual CO_2 mass emissions for each type of fuel by using either Equation C2a or C2c of this section, as appropriate.

98.33(a)(2)(i)

Equation C-2a of this section applies to any type of fuel listed in Table C-1 of the subpart, except for municipal solid waste (MSW). For MSW combustion, use Equation C-2c of this section.

$$CO_2 = 1 x 10^{-3} * Fuel * HHV * EF \qquad \text{(Eq. C-2a)}$$

Where:

CO_2 = Annual CO_2 mass emissions for a specific fuel type (metric tons).

Fuel = Mass or volume of the fuel combusted during the year, from company records as defined in §98.6 (express mass in short tons for solid fuel, volume in standard cubic feet for gaseous fuel, and volume in gallons for liquid fuel).

HHV = Annual average high heat value of the fuel from all valid samples for the year (mmBtu per mass or volume). The average HHV shall be calculated according to the requirements of paragraph (a)(2)(ii) of this section.

EF = Fuel-specific default CO_2 emission factor, from Table C–1 of this subpart (kg CO_2/mmBtu).

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(a)(2)(ii)

The minimum required sampling frequency for determining the annual average HHV (e.g., monthly, quarterly, semi-annually, or by lot) is specified in §98.34. The method for computing the annual average HHV is a function of unit size and how frequently you perform or receive from the fuel supplier the results of fuel sampling for HHV. The method is specified in paragraph (a)(2)(ii)(A) or (a)(2)(ii)(B) of this section, as

Where:

CH_4 or N_2O = Annual CH_4 or N_2O emissions from the combustion of natural gas (metric tons).

Fuel = Annual natural gas usage, from gas billing records (therms).

EF = Fuel-specific default emission factor for CH_4 or N_2O, from Table C-2 of this subpart (kg CH_4 or N_2O per mmBtu).

0.1 = Conversion factor from therms to mmBtu

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(c)(1)(ii)

Use Equation C-8b to calculate CH_4 and N_2O emissions when natural gas usage is obtained from gas billing records in units of mmBtu.

CH_4 *or* $N_2O = 1 \times 10^{-3} * Fuel * EF$ *(Eq.* C-8b)

Where:

CH_4 or N_2O = Annual CH_4 or N_2O emissions from the combustion of natural gas (metric tons).

Fuel = Annual natural gas usage, from gas billing records (mmBtu).

EF = Fuel-specific default emission factor for CH_4 or N_2O, from Table C-2 of this subpart (kg CH_4 or N_2O per mmBtu).

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(c)(2)

Use Equation C-9a of this section to estimate CH_4 and N_2O emissions for any fuels for which you use the Tier 2 Equation C-2a of this section to estimate CO_2 emissions. Use the same values for fuel consumption and HHV that you use for the Tier 2 calculation.

$$CH_4 \text{ or } N_2O = 1 \times 10^{-3} * HHV * EF * Fuel \qquad \text{(Eq. C-9a)}$$

Where:

CH_4 or N_2O = Annual CH_4 or N_2O emissions from the combustion of a particular type of fuel (metric tons).

Fuel = Mass or volume of the fuel combusted during the reporting year.

HHV = High heat value of the fuel, averaged for all valid measurements for the reporting year (mmBtu per mass or volume).

EF = Fuel-specific default emission factor for CH_4 or N_2O, from Table C–2 of this subpart (kg CH_4 or N_2O per mmBtu).

1×10^{-3} = Conversion factor from kilograms to metric tons.

98.33(c)(3)

Use Equation C–9b of this section to estimate CH_4 and N_2O emissions for any fuels for which you use Equation C–2c of this section to calculate the CO_2 emissions. Use the same values for steam generation and the ratio "B" that you use for Equation C–2c.

$$CH_4 \text{ or } N_2O = 1 \times 10^{-3} \text{ Steam} * B * EF \qquad \text{(Eq. C-9b)}$$

Where:

Table C-1 to Subpart C of Part 98 —Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel

Fuel type	Default high heat value	Default CO_2 emission factor
Coal and coke	mmBtu/short ton	kg CO_2/mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO_2/mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products	mmBtu/gallon	kg CO_2/mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG) [1]	0.092	61.71
Propane [1]	0.091	62.87
Propylene [2]	0.091	67.77
Ethane [1]	0.068	59.60
Ethanol	0.084	68.44
Ethylene [2]	0.058	65.96
Isobutane [1]	0.099	64.94
Isobutylene [1]	0.103	68.86
Butane [1]	0.103	64.77
Butylene [1]	0.105	68.72
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22
Pentanes Plus	0.110	70.02
Petrochemical Feedstocks	0.125	71.02
Petroleum Coke	0.143	102.41
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22
Aviation Gasoline	0.120	69.25
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36

Crude Oil	0.138	74.54
Other fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Municipal Solid Waste	9.95 [3]	90.7
Tires	28.00	85.97
Plastics	38.00	75.00
Petroleum Coke	30.00	102.41
Other fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Blast Furnace Gas	0.092×10^{-3}	274.32
Coke Oven Gas	0.599×10^{-3}	46.85
Propane Gas	2.516×10^{-3}	61.46
Fuel Gas [4]	1.388×10^{-3}	59.00
Biomass fuels—solid	mmBtu/short ton	kg CO_2/mmBtu
Wood and Wood Residuals (dry basis) [5]	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels—gaseous	mmBtu/scf	kg CO_2/mmBtu
Landfill Gas	0.485×10^{-3}	52.07
Other Biomass Gases	0.655×10^{-3}	52.07
Biomass Fuels—Liquid	mmBtu/gallon	kg CO_2/mmBtu
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

[1] The HHV for components of LPG determined at 60 °F and saturation pressure with the exception of ethylene.

[2] Ethylene HHV determined at 41 °F (5 °C) and saturation pressure.

[3] Use of this default HHV is allowed only for: (a) Units that combust MSW, do not generate steam, and are allowed to use Tier 1; (b) units that derive no more than 10 percent of their annual heat input from MSW and/or tires; and (c) small batch incinerators that combust no more than 1,000 tons of MSW per year.

[4] Reporters subject to subpart X of this part that are complying with § 98.243(d) or subpart Y of this part may only use the default HHV and the default CO_2 emission factor for fuel gas combustion under the conditions prescribed in § 98.243(d)(2)(i) and (d)(2)(ii) and § 98.252(a)(1) and (a)(2), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

[5] Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100)*HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.

[78 FR page 71950, Nov. 29, 2013]

Table C-2 to Subpart C of Part 98 —Default CH_4 and N_2O Emission Factors for Various Types of Fuel

Fuel type	Default CH_4 emission factor (kg CH_4/mmBtu)	Default N_2O emission factor (kg N_2O/mmBtu)
Coal and Coke (All fuel types in Table C-1)	1.1×10^{-02}	1.6×10^{-03}
Natural Gas	1.0×10^{-03}	1.0×10^{-04}
Petroleum (All fuel types in Table C-1)	3.0×10^{-03}	6.0×10^{-04}
Fuel Gas	3.0×10^{-03}	6.0×10^{-04}
Municipal Solid Waste	3.2×10^{-02}	4.2×10^{-03}
Tires		

	3.2×10^{-02}	4.2×10^{-03}
Blast Furnace Gas	2.2×10^{-05}	1.0×10^{-04}
Coke Oven Gas	4.8×10^{-04}	1.0×10^{-04}
Biomass Fuels—Solid (All fuel types in Table C-1, except wood and wood residuals)	3.2×10^{-02}	4.2×10^{-03}
Wood and wood residuals	7.2×10^{-03}	3.6×10^{-03}
Biomass Fuels—Gaseous (All fuel types in Table C-1)	3.2×10^{-03}	6.3×10^{-04}
Biomass Fuels—Liquid (All fuel types in Table C-1)	1.1×10^{-03}	1.1×10^{-04}

Note: Those employing this table are assumed to fall under the IPCC definitions of the "Energy Industry" or "Manufacturing Industries and Construction". In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC "Energy Industry" category may employ a value of 1g of CH_4/mmBtu.

[75 FR page 79154, Dec. 17, 2010; 78 FR page 71952, Nov. 29, 2013]

ISSN 2167-8065

G3516B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	90.9
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	902
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	3300
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	105
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1380 bhp@1400rpm
SET POINT TIMING:	30		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1380	1380	1035	690
INLET AIR TEMPERATURE			°F	105	105	105	105
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	7443	7443	7972	8562
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	8263	8263	8850	9506
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	3289	3289	2580	1804
AIR FLOW	(WET)	(4)(5)	lb/hr	13862	13862	10874	7602
FUEL FLOW (60ºF, 14.7 psia)			scfm	190	190	152	109
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	94.6	94.6	76.8	54.0
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	982	982	968	977
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	9060	9060	7047	4965
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	14366	14366	11279	7892
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	2.43	2.43	2.60	2.56
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.76	4.76	5.10	5.18
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.71	0.71	0.77	0.78
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.48	0.48	0.51	0.52
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.43	0.43	0.43	0.42
CO2		(9)(10)	g/bhp-hr	473	473	505	549
EXHAUST OXYGEN		(9)(12)	% DRY	9.0	9.0	8.7	8.3
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	24154	24154	22538	21024
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	6110	6110	5092	4074
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	4475	4475	3978	3363
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	14266	14266	11973	4499
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	5823	5823	5466	3519

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(14)(15)	Btu/min	46918
TOTAL AFTERCOOLER CIRCUIT (2AC)	(14)(15)	Btu/min	6114
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set EM1748-02-001, Printed 11Oct2018

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3516B G3516B 1380 BHP @ 1400 RPM - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	14,459	3,267	196,028	9060	543,600
Brake Horse Power:	1380				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.027	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition

N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 982

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.2916	0.264	0.086

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	2	Layers	1
Square				cpsi	300
	X&Y (inch)	15	24	Depth	3.5

Open area for gas flow (ft2):	4.47
Linear Velocity(ft/min):	2,026
Foil thickness (inches):	0.002

Calculated Space Velocity: 150,282

Safety Value: 2

Pressure Drop

300	3.37

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	1.52	6.66	64.04	38.52
CO	2.43	7.39	32.38	311.24	187.19
VOC	0.48	1.46	6.40	61.48	36.98
H2CO	0.43	1.31	5.73	55.07	33.12

Target Conversions

NOx	0.0%
CO	88.0%
VOC(NMNE)	45.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.52	6.66	64.04	38.52
CO	0.2916	0.89	3.89	37.35	22.46
VOC	0.264	0.80	3.52	33.81	20.34
H2CO	0.086	0.26	1.15	11.01	6.62

Conversions Catalyst Design

NOx	0.0%
CO	88.0%
VOC(NMNE)	45.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.52	6.66	64.04	38.52
CO	0.2916	0.89	3.89	37.35	22.46
VOC	0.264	0.80	3.52	33.81	20.34
H2CO	0.086	0.26	1.15	11.01	6.62

Customer: Kodiak Gas
Sales Person: KW
Date: 12/18/2018
Project: Lucid Frac Cat G3516B
Contact: Cody Stidham

Notes: (2) ERH-1524-2 Oxidation Elements Installed

G3516

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	LOW NOX UPGRADE
COMPRESSION RATIO:	8	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	HPG IMPCO
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	40.0-45.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	90.9
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	902
EXHAUST MANIFOLD:	ASWC	ALTITUDE(ft):	3300
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	105
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1340 bhp@1400rpm
SET POINT TIMING:	33		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1340	1340	1005	670
INLET AIR TEMPERATURE			°F	105	105	105	105
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	8355	8355	8705	9054
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	9276	9276	9664	10052
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	3450	3450	2678	1802
AIR FLOW	(WET)	(4)(5)	lb/hr	14539	14539	11284	7596
FUEL FLOW (60ºF, 14.7 psia)			scfm	207	207	162	112
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	78.5	78.5	64.2	44.1
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	952	952	957	958
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	9320	9320	7262	4901
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	15089	15089	11714	7894
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	3.04	3.04	3.07	2.99
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.55	4.55	5.02	5.24
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.68	0.68	0.75	0.79
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.45	0.45	0.50	0.52
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.28	0.28	0.56	0.59
CO2		(9)(10)	g/bhp-hr	531	531	550	561
EXHAUST OXYGEN		(9)(12)	% DRY	8.5	8.5	8.4	8.0
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	42247	42247	36037	28285
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	5313	5313	4428	3543
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	6301	6301	5374	4218
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	13426	13426	7623	2249
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	4859	4859	3795	2538

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(14)(15)	Btu/min	68129
TOTAL AFTERCOOLER CIRCUIT (2AC)	(14)(15)	Btu/min	5102
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set DM9400-05-001, Printed 11Oct2018

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3516 G3516TALE PLUS 1340bhp 1400rpm - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	15,190	3,432	205,938	9320	559,200
Brake Horse Power:	1340				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.027	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition

N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 952

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.3952	0.2385	0.056

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	2	Layers	1
Square				cpsi	300
	X&Y (inch)	15	24	Depth	3.5

Open area for gas flow (ft2):	4.47
Linear Velocity(ft/min):	2,084
Foil thickness (inches):	0.002

Calculated Space Velocity: 157,879

Safety Value: 2

Pressure Drop

300	3.46

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	1.48	6.47	59.19	35.60
CO	3.04	8.98	39.34	359.89	216.45
VOC	0.45	1.33	5.82	53.27	32.04
H2CO	0.28	0.83	3.62	33.15	19.94

Target Conversions

NOx	0.0%
CO	87.0%
VOC(NMNE)	47.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.48	6.47	59.19	35.60
CO	0.3952	1.17	5.11	46.79	28.14
VOC	0.2385	0.70	3.08	28.23	16.98
H2CO	0.056	0.17	0.72	6.63	3.99

Conversions Catalyst Design

NOx	0.0%
CO	87.0%
VOC(NMNE)	47.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.48	6.47	59.19	35.60
CO	0.3952	1.17	5.11	46.79	28.14
VOC	0.2385	0.70	3.08	28.23	16.98
H2CO	0.056	0.17	0.72	6.63	3.99

Customer: Kodiak Gas
Sales Person: KW
Date: 12/18/2018
Project: Lucid Frac Cat G3516TALE
Contact: Cody Stidham

Notes: (2) ERH-1524-2 Oxidation Elements Installed

G3520B

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1400	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	8	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	CAT WIDE RANGE WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 2 INLET (°F):	130		
AFTERCOOLER - STAGE 1 INLET (°F):	201	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	210	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	7.0-40.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	90.9
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	902
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	3300
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	105
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1725 bhp@1400rpm
SET POINT TIMING:	30		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**57%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1725	1526	1144	862
INLET AIR TEMPERATURE			°F	90	105	105	105
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	7381	7557	7972	8370
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	8195	8390	8851	9292
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	4085	3771	2922	2258
AIR FLOW	(WET)	(4)(5)	lb/hr	17692	15893	12313	9515
FUEL FLOW (60ºF, 14.7 psia)			scfm	235	213	169	133
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	95.7	86.7	68.5	53.8
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	981	977	990	1020
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	11538	10345	8094	6397
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	18315	16456	12759	9868
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	2.32	2.36	2.42	2.43
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	5.40	5.49	5.59	5.57
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.81	0.82	0.84	0.84
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.54	0.55	0.56	0.56
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.45	0.46	0.46	0.41
CO2		(9)(10)	g/bhp-hr	456	468	497	523
EXHAUST OXYGEN		(9)(12)	% DRY	9.2	9.0	8.7	8.3
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	26758	25525	23055	20934
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	7332	6769	5688	4889
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	5586	5313	4719	4194
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	17260	17260	11071	6030
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	8307	8307	6746	5057

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(14)(15)	Btu/min	54261
TOTAL AFTERCOOLER CIRCUIT (2AC)	(14)(15)	Btu/min	8723
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set DM9404-06-001, Printed 11Oct2018

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3520B Caterpillar G3520B 1725 bhp @ 1400 RPM - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	16,568	3,743	224,610	10345	620,700
Brake Horse Power:	1725				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.027	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition

N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 977

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.232	0.27	0.09

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	3	Layers	1
Square				cpsi	300
	X&Y (inch)	15	24	Depth	3.5

Open area for gas flow (ft2):	6.71
Linear Velocity(ft/min):	1,542
Foil thickness (inches):	0.002

Calculated Space Velocity: 114,796

Safety Value: 2

Pressure Drop

300	2.56

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	1.90	8.33	69.86	42.02
CO	2.32	8.82	38.64	324.17	194.96
VOC	0.54	2.05	8.99	75.45	45.38
H2CO	0.45	1.71	7.50	62.88	37.82

Target Conversions

NOx	0.0%
CO	90.0%
VOC(NMNE)	50.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.90	8.33	69.86	42.02
CO	0.232	0.88	3.86	32.42	19.50
VOC	0.27	1.03	4.50	37.73	22.69
H2CO	0.09	0.34	1.50	12.58	7.56

Conversions Catalyst Design

NOx	0.0%
CO	90.0%
VOC(NMNE)	50.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.90	8.33	69.86	42.02
CO	0.232	0.88	3.86	32.42	19.50
VOC	0.27	1.03	4.50	37.73	22.69
H2CO	0.09	0.34	1.50	12.58	7.56

Customer: Kodiak Gas
Sales Person: KW
Date: 12/18/2018
Project: Lucid Frac Cat G3520B
Contact: Cody Stidham

Notes: (3) ERH-1524-2 Oxidation Elements Installed

G3606

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	9.2	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER WATER INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	190	**SITE CONDITIONS:**	
ASPIRATION:	TA	FUEL:	Nat Gas
COOLING SYSTEM:	JW, OC+AC	FUEL PRESSURE RANGE(psig):	42.8-47.0
CONTROL SYSTEM:	CIS/ADEM3	FUEL METHANE NUMBER:	84.7
EXHAUST MANIFOLD:	DRY	FUEL LHV (Btu/scf):	905
COMBUSTION:	LOW EMISSION	ALTITUDE(ft):	500
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	MAXIMUM INLET AIR TEMPERATURE(°F):	100
		STANDARD RATED POWER:	1775 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1775	1775	1331	888
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6860	6860	7102	7620
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7610	7610	7878	8452
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	4922	4922	3806	2564
AIR FLOW	(WET)	(3)(4)	lb/hr	20926	20926	16183	10902
FUEL FLOW (60ºF, 14.7 psia)			scfm	224	224	174	125
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	74.3	74.3	57.9	41.2
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	847	847	870	937
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	12232	12232	9629	6833
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	21541	21541	16660	11243
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.75	2.75	2.75	2.75
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	6.31	6.31	6.52	6.78
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.95	0.95	0.98	1.02
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.63	0.63	0.65	0.68
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.26	0.26	0.28	0.31
CO2		(8)(9)	g/bhp-hr	442	442	461	495
EXHAUST OXYGEN		(8)(11)	% DRY	12.8	12.8	12.1	11.1
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	18591	18591	15466	12926
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	7103	7103	6619	6199
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	9133	9133	8667	8453
HEAT REJ. TO AFTERCOOLER (AC)		(12)(13)	Btu/min	16775	16775	9135	1777

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(13)	Btu/min	20450
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(13)(14)	Btu/min	28573
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.01.01
Ref. Data Set DM8605-06-001, Printed 16May2016

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3606 G3606 - 1775bhp - 1000 RPM - 1 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	21,387	4,832	289,943	12146	728,760
Brake Horse Power:	1775				
			Maximum Pressure Drop (in)		12
Molecular weight:	28.50		0.029	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition		
N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 847

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.495	0.188	0.02

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	3	Layers	1
Square				cpsi	300
	X&Y (inch)	15	24	Depth	3.5

Open area for gas flow (ft2):	6.71				
Linear Velocity(ft/min):	1,811	Calculated Space Velocity:	148,187	Safety Value	2
Foil thickness (inches):	0.002				

Pressure Drop

300	3.01

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	1.96	8.57	55.69	33.49
CO	2.75	10.76	47.13	306.30	184.22
VOC	0.94	3.68	16.11	104.70	62.97
H2CO	0.40	1.57	6.86	44.55	26.79

Target Conversions

NOx	0.0%
CO	82.0%
VOC(NMNE)	80.0%
H2CO	95.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.96	8.57	55.69	33.49
CO	0.495	1.94	8.48	55.13	33.16
VOC	0.188	0.74	3.22	20.94	12.59
H2CO	0.02	0.08	0.34	2.23	1.34

Conversions Catalyst Design

NOx	0.0%
CO	82.0%
VOC(NMNE)	80.0%
H2CO	95.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	1.96	8.57	55.69	33.49
CO	0.495	1.94	8.48	55.13	33.16
VOC	0.188	0.74	3.22	20.94	12.59
H2CO	0.02	0.08	0.34	2.23	1.34

Customer:	Kodiak Gas	Project:	Lucid Frac Cat G3606A3
Sales Person:	KW	Date: 12/18/2018	Contact: Cody Stidham

Notes: (2) ERH-1536-2 Oxidation Elements Installed

G3606

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	90.9
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	902
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	3300
COMBUSTION:	LOW EMISSION	MAXIMUM INLET AIR TEMPERATURE(°F):	105
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	1875 bhp@1000rpm
SET POINT TIMING:	18		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1875	1875	1406	938
INLET AIR TEMPERATURE			°F	105	105	105	105
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	6811	6811	7089	7668
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	7562	7562	7870	8513
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	4825	4825	3655	2514
AIR FLOW	(WET)	(4)(5)	lb/hr	20335	20335	15404	10593
FUEL FLOW (60ºF, 14.7 psia)			scfm	236	236	184	133
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	100.0	100.0	76.7	54.9
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	835	835	907	990
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	11819	11819	9465	6920
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	20964	20964	15894	10947
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	2.20	2.20	2.20	2.20
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.60	4.60	4.81	5.08
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.43	0.43	0.44	0.47
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.29	0.29	0.30	0.32
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.20	0.20	0.21	0.24
CO2		(9)(10)	g/bhp-hr	433	433	447	485
EXHAUST OXYGEN		(9)(12)	% DRY	10.9	10.9	10.7	10.3
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	21989	21989	17925	14590
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	5631	5631	5527	5337
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	11709	11709	10800	9347
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	17914	17914	8859	2670
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	7787	7787	4701	2309

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	42998
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	22227
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.08.00
Ref. Data Set EM0555-07-001, Printed 11Oct2018

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3606 A4 Caterpillar G3606 A4 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	21,253	4,802	288,131	11830	709,800
Brake Horse Power:	1875				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.030	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition		
N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 821

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.33	0.174	0.04

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	2	Layers	1
Square				cpsi	300
	X&Y (inch)	15	36	Depth	3.5

Open area for gas flow (ft2):	6.81
Linear Velocity(ft/min):	1,738
Foil thickness (inches):	0.002

Calculated Space Velocity: 145,158

Safety Value: 2

Pressure Drop

300	2.89

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.07	9.05	59.20	35.60
CO	2.20	9.09	39.83	260.47	156.65
VOC	0.29	1.20	5.25	34.33	20.65
H2CO	0.20	0.83	3.62	23.68	14.24

Target Conversions

NOx	0.0%
CO	85.0%
VOC(NMNE)	40.0%
H2CO	80.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.07	9.05	59.20	35.60
CO	0.33	1.36	5.97	39.07	23.50
VOC	0.174	0.72	3.15	20.60	12.39
H2CO	0.04	0.17	0.72	4.74	2.85

Conversions Catalyst Design

NOx	0.0%
CO	85.0%
VOC(NMNE)	40.0%
H2CO	80.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.07	9.05	59.20	35.60
CO	0.33	1.36	5.97	39.07	23.50
VOC	0.174	0.72	3.15	20.60	12.39
H2CO	0.04	0.17	0.72	4.74	2.85

Customer: Kodiak Gas
Sales Person: KW
Date: 12/18/2018
Project: Lucid Frac Cat G3606A4
Contact: Cody Stidham

Notes: (2) ERH-1536-2 Oxidation Elements Installed

G3608

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
AFTERCOOLER - STAGE 2 INLET (°F):	130		WITH AIR FUEL RATIO CONTROL
AFTERCOOLER - STAGE 1 INLET (°F):	174	**SITE CONDITIONS:**	
JACKET WATER OUTLET (°F):	190	FUEL:	Gas Analysis
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL METHANE NUMBER:	79.4
CONTROL SYSTEM:	ADEM4	FUEL LHV (Btu/scf):	943
EXHAUST MANIFOLD:	DRY	ALTITUDE(ft):	500
COMBUSTION:	LOW EMISSION	INLET AIR TEMPERATURE(°F):	77
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	STANDARD RATED POWER:	2500 bhp@1000rpm
SET POINT TIMING:	18		

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	2500	2500	1875	1250
INLET AIR TEMPERATURE			°F	77	77	77	77
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(3)	Btu/bhp-hr	6755	6755	7001	7506
FUEL CONSUMPTION (HHV)		(3)	Btu/bhp-hr	7487	7487	7759	8319
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(4)(5)	ft3/min	6121	6121	4633	3166
AIR FLOW	(WET)	(4)(5)	lb/hr	27140	27140	20544	14037
FUEL FLOW (60ºF, 14.7 psia)			scfm	298	298	232	166
INLET MANIFOLD PRESSURE		(6)	in Hg(abs)	98.2	98.2	74.6	52.4
EXHAUST TEMPERATURE - ENGINE OUTLET		(7)	°F	851	851	898	954
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(5)	ft3/min	15959	15959	12532	8933
EXHAUST GAS MASS FLOW	(WET)	(8)(5)	lb/hr	27960	27960	21181	14493
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(9)(10)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(9)(10)	g/bhp-hr	2.23	2.23	2.23	2.23
THC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	4.12	4.12	4.33	4.35
NMHC (mol. wt. of 15.84)		(9)(10)	g/bhp-hr	0.60	0.60	0.63	0.63
NMNEHC (VOCs) (mol. wt. of 15.84)		(9)(10)(11)	g/bhp-hr	0.26	0.26	0.27	0.27
HCHO (Formaldehyde)		(9)(10)	g/bhp-hr	0.23	0.23	0.23	0.24
CO2		(9)(10)	g/bhp-hr	429	429	441	473
EXHAUST OXYGEN		(9)(12)	% DRY	11.4	11.4	11.1	10.6
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(13)	Btu/min	26422	26422	22742	19093
HEAT REJ. TO ATMOSPHERE		(13)	Btu/min	10366	10366	10429	10183
HEAT REJ. TO LUBE OIL (OC)		(13)	Btu/min	12737	12737	11880	10693
HEAT REJ. TO A/C - STAGE 1 (1AC)		(13)(14)	Btu/min	17974	17974	8469	1729
HEAT REJ. TO A/C - STAGE 2 (2AC)		(13)(14)	Btu/min	7273	7273	4609	2385

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+1AC)	(14)(15)	Btu/min	47937
TOTAL STAGE 2 AFTERCOOLER CIRCUIT (OC+2AC)	(14)(15)	Btu/min	22921
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 6.09.01
Ref. Data Set EM0655-06-001, Printed 10Dec2018

POWERTHERM

ICE Catalyst Sizing Program

ENGINE INPUT (Manufacturer, Model, Type) - Caterpillar G3608 2500 BHP @ 1000 RPM Caterpillar G3608 A4 - EXPERT MODE

Input Mass Flow Rate

	lbs/hr	"scfm"	"scfh"	"acfm"	"acfh"
lb/hr(Estimated):	28,015	6,330	379,802	15959	957,540
Brake Horse Power:	2500				
			Maximum Pressure Drop (in)		
Molecular weight:	28.50		0.029	Exhaust Density (lbs/ft3)	

Estimated Exhaust Gas Composition

N2	74.5	vol%
O2	10	vol%
H2O	10	vol%
CO2	6	vol%

Inlet Temperature

Process Temperature (F): 851

Enter permitted grams per brake horse power hour (g/bhp-hr)

NOx**	CO**	VOC(NMNE)**	H2CO**
0.5	0.4014	0.1352	0.0575

Catalyst Type

NG/Diesel (Lean)

Catalyst Module Details

Module Shape		Module/Layer	3	Layers	1
Square				cpsi	300
	X&Y (inch)	15	36	Depth	3.5

Open area for gas flow (ft2):	10.21
Linear Velocity(ft/min):	1,563
Foil thickness (inches):	0.002

Calculated Space Velocity: 127,560

Safety Value: 2

Pressure Drop

300	2.60

Inlet Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.50	2.76	12.07	59.88	36.01
CO	2.23	12.29	53.83	267.06	160.62
VOC	0.26	1.43	6.28	31.14	18.73
H2CO	0.23	1.27	5.55	27.54	16.56

Target Conversions

NOx	0.0%
CO	82.0%
VOC(NMNE)	48.0%
H2CO	75.0%

Required Output Pollutants

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.76	12.07	59.88	36.01
CO	0.4014	2.21	9.69	48.07	28.91
VOC	0.1352	0.74	3.27	16.19	9.74
H2CO	0.0575	0.32	1.39	6.89	4.14

Conversions Catalyst Design

NOx	0.0%
CO	82.0%
VOC(NMNE)	48.0%
H2CO	75.0%

Output Pollutants with Catalyst Sizing

	g/bhp-hr	lb/hr	tons/year	ppmv	ppmvd%O2*
NOx	0.5	2.76	12.07	59.88	36.01
CO	0.4014	2.21	9.69	48.07	28.91
VOC	0.1352	0.74	3.27	16.19	9.74
H2CO	0.0575	0.32	1.39	6.89	4.14

Customer: Kodiak Gas
Sales Person: KW
Date: 12/19/2018
Project: Lucid Frac Cat G3608A4
Contact: Cody Stidham

Notes: (3) ERH-1536-2 Oxidation Catalyst Elements

EZReporter Default Report

Sample Information

	Sample Information
Sample Name	Lucid Frac Cat Comp Fuel
Gas Temp	34
Gas Pressure	292
Meter Number	83740
Operator	T Kirk
Sample Notes	No H2S Detected
Method Name	09-01-2018.met
Injection Date	2018-10-29 12:09:50
Report Date	2018-10-29 12:19:11
EZReporter Configuration File	Agave Energy Configuration.cfg 3.1.cfg
Source Data File	9077.dat
NGA Phys. Property Data Source	GPA Standard 2145-09 (FPS)
Data Source	EZIQ data system connection

Component Results

Component Name	Ret. Time	Peak Area	Norm%	Gross HV (Dry) (BTU / Ideal cu.ft.)	Relative Gas Density (Dry)	GPM (Dry) (Gal. / 1000 cu.ft.)
Nitrogen	8.580	24943.0	2.7521	0.0	0.02662	0.000
Methane	8.880	429327.0	89.9126	910.2	0.49803	0.000
Carbon Dioxide	12.403	0.0	0.0000	0.0	0.00000	0.000
Ethane	14.940	59352.0	6.9641	123.5	0.07230	1.866
Hydrogen Sulfide	23.825	0.0	0.0000	0.0	0.00000	0.000
Propane	44.640	2908.0	0.2900	7.3	0.00442	0.080
i-Butane	20.571	0.0	0.0000	0.0	0.00000	0.000
n-Butane	22.180	424.0	0.0098	0.3	0.00020	0.003
i-Pentane	27.420	208.0	0.0049	0.2	0.00012	0.002
n-Pentane	29.740	329.0	0.0088	0.4	0.00022	0.003
n-Hexane	0.000	582.0	0.0176	0.8	0.00052	0.007
n-Heptane	0.000	788.0	0.0078	0.4	0.00027	0.004
n-Octane	0.000	1022.0	0.0225	1.4	0.00089	0.012
n-Nonane	0.000	275.0	0.0098	0.7	0.00043	0.006
Total:			100.0000	1045.3	0.60401	1.982

Results Summary

Result	Dry
Total Raw Mole% (Dry)	102.0660
Pressure Base (psia)	14.730
Temperature Base	60.0
Gross Heating Value (BTU / Ideal cu.ft.)	1045.3
Gross Heating Value (BTU / Real cu.ft.)	1047.7
Relative Density (G), Real	0.6051
Compressibility (Z) Factor	0.9977
Wobbe Index	1346.8

GRI-HAPCalc ® 3.01
Engines Report

Facility ID:	**FRAC CAT**	**Notes:**
Operation Type:	**COMPRESSOR STATION**	
Facility Name:	**FRAC CAT CS**	
User Name:		
Units of Measure:	**U.S. STANDARD**	

Note: Emissions less than 5.00E-09 tons (or tonnes) per year are considered insignificant and are treated as zero. These emissions are indicated on the report with a "0". Emissions between 5.00E-09 and 5.00E-05 tons (or tonnes) per year are represented on the report with "0.0000".

Engine Unit

Unit Name: CAT 3516

Hours of Operation:	8,760	Yearly
Rate Power:	1,380	hp
Fuel Type:	NATURAL GAS	
Engine Type:	4-Stroke, Lean Burn	
Emission Factor Set:	FIELD > EPA > LITERATURE	
Additional EF Set:	-NONE-	

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set
HAPs			
Tetrachloroethane	0.0001	0.00000820 g/bhp-hr	EPA
Formaldehyde	1.5311	0.11500000 g/bhp-hr	GRI Field
Methanol	0.0582	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.0666	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0117	0.00088120 g/bhp-hr	EPA
Acrolein	0.2259	0.01696380 g/bhp-hr	EPA
Benzene	0.0027	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0179	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0017	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0081	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0110	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0007	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0012	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0003	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0005	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0015	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0002	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0105	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0005	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0005	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0019	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0000	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA

Chrysene	0.0000	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA
Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0007	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0009	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0010	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0012	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0013	0.00010030 g/bhp-hr	EPA
Chloroform	0.0013	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0014	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0018	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0016	0.00012110 g/bhp-hr	EPA
Total	1.9642		

Criteria Pollutants

PM	0.4388	0.03296090 g/bhp-hr	EPA
CO	11.0947	0.83333330 g/bhp-hr	GRI Field
NMEHC	5.1849	0.38944040 g/bhp-hr	EPA
NOx	189.7196	14.25000000 g/bhp-hr	GRI Field
SO2	0.0258	0.00194060 g/bhp-hr	EPA

Other Pollutants

Butryaldehyde	0.0044	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	72.5927	5.45250000 g/bhp-hr	GRI Field
Ethane	2.0969	0.15750000 g/bhp-hr	GRI Field
Propane	0.1997	0.01500000 g/bhp-hr	GRI Field
Butane	0.0266	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0100	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0313	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0540	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0010	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0012	0.00008880 g/bhp-hr	EPA
n-Octane	0.0154	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0010	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0006	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0015	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0048	0.00036300 g/bhp-hr	EPA
CO2	4,833.3591	363.03769350 g/bhp-hr	EPA

Unit Name: CAT 3516LE

Hours of Operation: 8,760 Yearly

Rate Power: 1,340 hp

Fuel Type: NATURAL GAS

Engine Type: 4-Stroke, Lean Burn

Emission Factor Set: FIELD > EPA > LITERATURE

Additional EF Set: -NONE-

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set

HAPs

Tetrachloroethane	0.0001	0.00000820 g/bhp-hr	EPA
Formaldehyde	1.4867	0.11500000 g/bhp-hr	GRI Field
Methanol	0.0565	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.0646	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0114	0.00088120 g/bhp-hr	EPA
Acrolein	0.2193	0.01696380 g/bhp-hr	EPA
Benzene	0.0027	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0174	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0017	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0079	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0107	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0007	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0011	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0003	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0005	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0014	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0002	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0101	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0005	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0004	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0019	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0000	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA
Chrysene	0.0000	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA
Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0006	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0009	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0010	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0011	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0013	0.00010030 g/bhp-hr	EPA
Chloroform	0.0012	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0014	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0017	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0016	0.00012110 g/bhp-hr	EPA
Total	1.9071		

Criteria Pollutants

PM	0.4261	0.03296090 g/bhp-hr	EPA
CO	10.7731	0.83333330 g/bhp-hr	GRI Field
NMEHC	5.0346	0.38944040 g/bhp-hr	EPA
NOx	184.2205	14.25000000 g/bhp-hr	GRI Field
SO2	0.0251	0.00194060 g/bhp-hr	EPA

Other Pollutants

Butryaldehyde	0.0043	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	70.4886	5.45250000 g/bhp-hr	GRI Field
Ethane	2.0361	0.15750000 g/bhp-hr	GRI Field
Propane	0.1939	0.01500000 g/bhp-hr	GRI Field

Butane	0.0259	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0097	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0304	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0525	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0010	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0011	0.00008880 g/bhp-hr	EPA
n-Octane	0.0150	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0010	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0006	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0014	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0047	0.00036300 g/bhp-hr	EPA
CO2	4,693.2617	363.03769350 g/bhp-hr	EPA

Unit Name: CAT 3520B

Hours of Operation: 8,760 Yearly

Rate Power: 1,725 hp

Fuel Type: NATURAL GAS

Engine Type: 4-Stroke, Lean Burn

Emission Factor Set: FIELD > EPA > LITERATURE

Additional EF Set: -NONE-

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set
HAPs			
Tetrachloroethane	0.0001	0.00000820 g/bhp-hr	EPA
Formaldehyde	1.9138	0.11500000 g/bhp-hr	GRI Field
Methanol	0.0728	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.0832	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0147	0.00088120 g/bhp-hr	EPA
Acrolein	0.2823	0.01696380 g/bhp-hr	EPA
Benzene	0.0034	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0224	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0022	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0101	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0137	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0008	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0015	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0004	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0006	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0018	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0003	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0131	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0006	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0006	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0024	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0001	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA
Chrysene	0.0000	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA

Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0008	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0011	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0013	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0014	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0017	0.00010030 g/bhp-hr	EPA
Chloroform	0.0016	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0017	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0022	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0020	0.00012110 g/bhp-hr	EPA
Total	2.4549		
Criteria Pollutants			
PM	0.5485	0.03296090 g/bhp-hr	EPA
CO	13.8684	0.83333330 g/bhp-hr	GRI Field
NMEHC	6.4811	0.38944040 g/bhp-hr	EPA
NOx	237.1495	14.25000000 g/bhp-hr	GRI Field
SO2	0.0323	0.00194060 g/bhp-hr	EPA
Other Pollutants			
Butryaldehyde	0.0055	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	90.7409	5.45250000 g/bhp-hr	GRI Field
Ethane	2.6211	0.15750000 g/bhp-hr	GRI Field
Propane	0.2496	0.01500000 g/bhp-hr	GRI Field
Butane	0.0333	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0125	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0391	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0676	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0013	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0015	0.00008880 g/bhp-hr	EPA
n-Octane	0.0193	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0013	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0008	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0019	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0060	0.00036300 g/bhp-hr	EPA
CO2	6,041.6989	363.03769350 g/bhp-hr	EPA

Unit Name: CAT 3606A3

Hours of Operation: 8,760 Yearly

Rate Power: 1,775 hp

Fuel Type: NATURAL GAS

Engine Type: 4-Stroke, Lean Burn

Emission Factor Set: FIELD > EPA > LITERATURE

Additional EF Set: -NONE-

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set

HAPs

Tetrachloroethane	0.0001	0.00000820 g/bhp-hr	EPA
Formaldehyde	1.9693	0.11500000 g/bhp-hr	GRI Field
Methanol	0.0749	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.0856	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0151	0.00088120 g/bhp-hr	EPA
Acrolein	0.2905	0.01696380 g/bhp-hr	EPA
Benzene	0.0035	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0231	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0022	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0104	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0141	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0009	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0015	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0004	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0007	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0019	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0003	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0134	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0006	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0006	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0025	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0001	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA
Chrysene	0.0000	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA
Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0008	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0011	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0013	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0015	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0017	0.00010030 g/bhp-hr	EPA
Chloroform	0.0016	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0018	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0023	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0021	0.00012110 g/bhp-hr	EPA
Total	2.5261		

Criteria Pollutants

PM	0.5644	0.03296090 g/bhp-hr	EPA
CO	14.2704	0.83333330 g/bhp-hr	GRI Field
NMEHC	6.6690	0.38944040 g/bhp-hr	EPA
NOx	244.0234	14.25000000 g/bhp-hr	GRI Field
SO2	0.0332	0.00194060 g/bhp-hr	EPA

Other Pollutants

Butryaldehyde	0.0057	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	93.3711	5.45250000 g/bhp-hr	GRI Field
Ethane	2.6971	0.15750000 g/bhp-hr	GRI Field
Propane	0.2569	0.01500000 g/bhp-hr	GRI Field

Butane	0.0342	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0128	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0402	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0695	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0013	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0015	0.00008880 g/bhp-hr	EPA
n-Octane	0.0198	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0013	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0008	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0019	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0062	0.00036300 g/bhp-hr	EPA
CO2	6,216.8206	363.03769350 g/bhp-hr	EPA

Unit Name: CAT 3606A4

Hours of Operation: 8,760 Yearly

Rate Power: 1,875 hp

Fuel Type: NATURAL GAS

Engine Type: 4-Stroke, Lean Burn

Emission Factor Set: FIELD > EPA > LITERATURE

Additional EF Set: -NONE-

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set
HAPs			
Tetrachloroethane	0.0001	0.00000820 g/bhp-hr	EPA
Formaldehyde	2.0803	0.11500000 g/bhp-hr	GRI Field
Methanol	0.0791	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.0904	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0159	0.00088120 g/bhp-hr	EPA
Acrolein	0.3069	0.01696380 g/bhp-hr	EPA
Benzene	0.0037	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0244	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0024	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0110	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0149	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0009	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0016	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0004	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0007	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0020	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0003	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0142	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0007	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0006	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0026	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0001	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA
Chrysene	0.0000	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA

Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0009	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0012	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0014	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0016	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0018	0.00010030 g/bhp-hr	EPA
Chloroform	0.0017	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0019	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0024	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0022	0.00012110 g/bhp-hr	EPA
Total	2.6685		

Criteria Pollutants

PM	0.5962	0.03296090 g/bhp-hr	EPA
CO	15.0743	0.83333330 g/bhp-hr	GRI Field
NMEHC	7.0447	0.38944040 g/bhp-hr	EPA
NOx	257.7712	14.25000000 g/bhp-hr	GRI Field
SO2	0.0351	0.00194060 g/bhp-hr	EPA

Other Pollutants

Butryaldehyde	0.0060	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	98.6314	5.45250000 g/bhp-hr	GRI Field
Ethane	2.8491	0.15750000 g/bhp-hr	GRI Field
Propane	0.2713	0.01500000 g/bhp-hr	GRI Field
Butane	0.0362	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0136	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0425	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0734	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0014	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0016	0.00008880 g/bhp-hr	EPA
n-Octane	0.0210	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0014	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0009	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0020	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0066	0.00036300 g/bhp-hr	EPA
CO2	6,567.0640	363.03769350 g/bhp-hr	EPA

Unit Name: CAT3608

Hours of Operation:	8,760	Yearly
Rate Power:	2,500	hp
Fuel Type:	NATURAL GAS	
Engine Type:	4-Stroke, Lean Burn	
Emission Factor Set:	FIELD > EPA > LITERATURE	
Additional EF Set:	-NONE-	

Calculated Emissions (ton/yr)

Chemical Name	Emissions	Emission Factor	Emission Factor Set

HAPs

Tetrachloroethane	0.0002	0.00000820 g/bhp-hr	EPA
Formaldehyde	2.7737	0.11500000 g/bhp-hr	GRI Field
Methanol	0.1055	0.00437210 g/bhp-hr	GRI Field
Acetaldehyde	0.1206	0.00500000 g/bhp-hr	GRI Field
1,3-Butadiene	0.0213	0.00088120 g/bhp-hr	EPA
Acrolein	0.4091	0.01696380 g/bhp-hr	EPA
Benzene	0.0049	0.00020500 g/bhp-hr	GRI Field
Toluene	0.0325	0.00134650 g/bhp-hr	EPA
Ethylbenzene	0.0032	0.00013100 g/bhp-hr	EPA
Xylenes(m,p,o)	0.0146	0.00060730 g/bhp-hr	EPA
2,2,4-Trimethylpentane	0.0199	0.00082510 g/bhp-hr	EPA
n-Hexane	0.0012	0.00005050 g/bhp-hr	GRI Field
Phenol	0.0021	0.00008850 g/bhp-hr	GRI Field
Styrene	0.0006	0.00002450 g/bhp-hr	GRI Field
Naphthalene	0.0009	0.00003800 g/bhp-hr	GRI Field
2-Methylnaphthalene	0.0026	0.00010960 g/bhp-hr	EPA
Acenaphthylene	0.0004	0.00001830 g/bhp-hr	EPA
Biphenyl	0.0189	0.00078500 g/bhp-hr	GRI Field
Acenaphthene	0.0001	0.00000410 g/bhp-hr	EPA
Fluorene	0.0009	0.00003650 g/bhp-hr	GRI Field
Phenanthrene	0.0008	0.00003430 g/bhp-hr	EPA
Ethylene Dibromide	0.0035	0.00014620 g/bhp-hr	EPA
Fluoranthene	0.0001	0.00000370 g/bhp-hr	EPA
Pyrene	0.0001	0.00000450 g/bhp-hr	EPA
Chrysene	0.0001	0.00000230 g/bhp-hr	EPA
Benzo(b)fluoranthene	0.0000	0.00000050 g/bhp-hr	EPA
Benzo(e)pyrene	0.0000	0.00000140 g/bhp-hr	EPA
Benzo(g,h,i)perylene	0.0000	0.00000140 g/bhp-hr	EPA
Vinyl Chloride	0.0012	0.00004920 g/bhp-hr	EPA
Methylene Chloride	0.0016	0.00006600 g/bhp-hr	EPA
1,1-Dichloroethane	0.0019	0.00007790 g/bhp-hr	EPA
1,3-Dichloropropene	0.0021	0.00008710 g/bhp-hr	EPA
Chlorobenzene	0.0024	0.00010030 g/bhp-hr	EPA
Chloroform	0.0023	0.00009410 g/bhp-hr	EPA
1,1,2-Trichloroethane	0.0025	0.00010500 g/bhp-hr	EPA
1,1,2,2-Tetrachloroethane	0.0032	0.00013200 g/bhp-hr	EPA
Carbon Tetrachloride	0.0029	0.00012110 g/bhp-hr	EPA
Total	3.5579		

Criteria Pollutants

PM	0.7950	0.03296090 g/bhp-hr	EPA
CO	20.0991	0.83333330 g/bhp-hr	GRI Field
NMEHC	9.3929	0.38944040 g/bhp-hr	EPA
NOx	343.6949	14.25000000 g/bhp-hr	GRI Field
SO2	0.0468	0.00194060 g/bhp-hr	EPA

Other Pollutants

Butryaldehyde	0.0080	0.00033330 g/bhp-hr	EPA
Chloroethane	0.0001	0.00000620 g/bhp-hr	EPA
Methane	131.5085	5.45250000 g/bhp-hr	GRI Field
Ethane	3.7987	0.15750000 g/bhp-hr	GRI Field
Propane	0.3618	0.01500000 g/bhp-hr	GRI Field

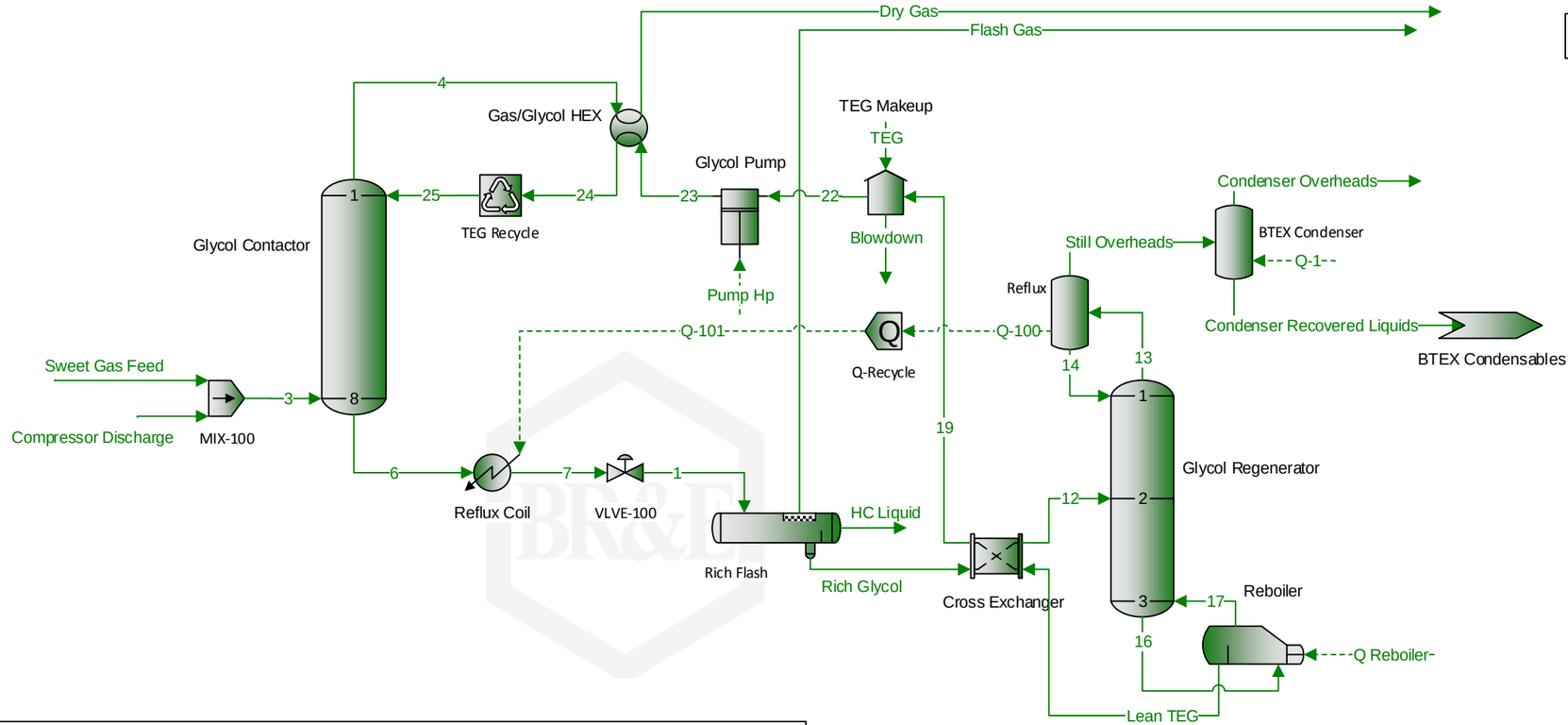
Butane	0.0482	0.00200000 g/bhp-hr	GRI Field
Cyclopentane	0.0181	0.00074920 g/bhp-hr	EPA
n-Pentane	0.0567	0.00235000 g/bhp-hr	GRI Field
Methylcyclohexane	0.0979	0.00405940 g/bhp-hr	EPA
1,2-Dichloroethane	0.0019	0.00007790 g/bhp-hr	EPA
1,2-Dichloropropane	0.0021	0.00008880 g/bhp-hr	EPA
n-Octane	0.0279	0.00115840 g/bhp-hr	EPA
1,2,3-Trimethylbenzene	0.0018	0.00007590 g/bhp-hr	EPA
1,2,4-Trimethylbenzene	0.0011	0.00004720 g/bhp-hr	EPA
1,3,5-Trimethylbenzene	0.0027	0.00011160 g/bhp-hr	EPA
n-Nonane	0.0088	0.00036300 g/bhp-hr	EPA
CO2	8,756.0853	363.03769350 g/bhp-hr	EPA

Frac Cat Compressor Station
75 MMSCFD Dehy Unit

"Condenser Overheads" HAPs = 2.512 lb/h
"Condenser Overheads" HAPs = 11 ton/yr
"Condenser Overheads" VOCs = 17.21 lb/h
"Condenser Overheads" VOCs = 75.36 ton/yr
"Still Overheads" HAPs = 186.7 lb/h
"Still Overheads" HAPs = 817.9 ton/yr
"Still Overheads" VOCs = 261.4 lb/h
"Still Overheads" VOCs = 1,145 ton/yr

Names	Units	22
Std Liquid Volumetric Flow	sgpm	20*

Names	Units	Sweet Gas Feed	Dry Gas
Water Content	lbm/MMSCF	201.8	3.778

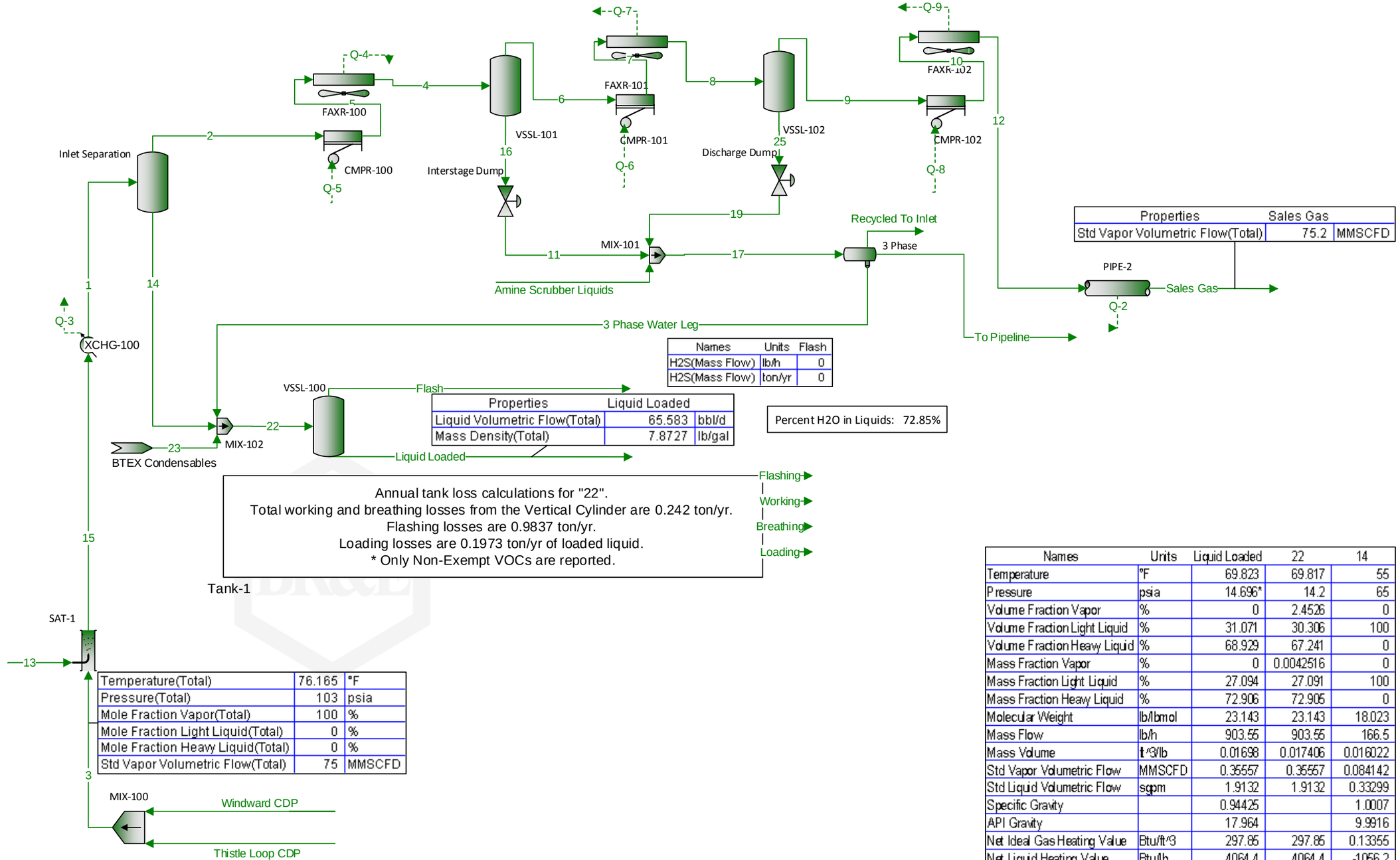


Names	Units	Flash Gas	Dry Gas	Condenser Overheads	Condenser Recovered Liquids	Still Overheads
H2S(Mass Flow)	lb/h	0.00154	0.369	0.00329	0.000584	0.00388
H2S(Mass Flow)	ton/yr	0.00673	1.62	0.0144	0.00256	0.017
Benzene(Mass Flow)	lb/h	0.319	86.8	0.931	17.4	18.3
Benzene(Mass Flow)	ton/yr	1.4	380	4.08	76.3	80.4
Toluene(Mass Flow)	lb/h	0.545	151	0.966	58.9	59.8
Toluene(Mass Flow)	ton/yr	2.39	662	4.23	258	262
Ethylbenzene(Mass Flow)	lb/h	0.096	30.3	0.0811	16	16.1
Ethylbenzene(Mass Flow)	ton/yr	0.42	133	0.355	70.3	70.6
o-Xylene(Mass Flow)	lb/h	0.102	25.1	0.104	23.9	24
o-Xylene(Mass Flow)	ton/yr	0.448	110	0.455	105	105
p-Xylene(Mass Flow)	lb/h	0.3644	122.69	0.28442	58.729	59.014
p-Xylene(Mass Flow)	ton/yr	1.5961	537.38	1.2458	257.23	258.48
m-Xylene(Mass Flow)	lb/h	0.047798	15.277	0.039137	8.2681	8.3072
m-Xylene(Mass Flow)	ton/yr	0.20935	66.913	0.17142	36.214	36.386

Names	Units	Q Reboiler	Q-100
Energy Rate	MBTU/h	1102	41.41

Names	Units	Condenser Recovered Liquids	Condenser Overheads	Still Overheads
Temperature	°F	80	80*	203.9
Pressure	psia	14.2	14.2	14.7
Volume Fraction Vapor	%	0	100	100
Volume Fraction Light Liquid	%	46.8	0	0
Volume Fraction Heavy Liquid	%	53.2	0	0
Molecular Weight	lb/lbmol	27.41	42.43	27.99
Std Vapor Volumetric Flow	MMSCFD	0.1941	0.007824	0.2019
Std Liquid Volumetric Flow	sgpm	1.274	0.1235	1.398
Specific Gravity		0.9135	1.465	0.9664
API Gravity		22.35		
Net Ideal Gas Heating Value	Btu/ft^3	545.6	1359	577.1
Gross Ideal Gas Heating Value	Btu/ft^3	620.8	1475	653.9
Net Liquid Heating Value	Btu/lb	6867	1.202e+04	7169
Gross Liquid Heating Value	Btu/lb	7908	1.305e+04	8211

Frac Cat Compressor Station 75 MMscfd



Properties	Sales Gas	
Std Vapor Volumetric Flow(Total)	75.2	MMSCFD

Names	Units	Flash
H2S(Mass Flow)	lb/h	0
H2S(Mass Flow)	ton/yr	0

Properties	Liquid Loaded	
Liquid Volumetric Flow(Total)	65.583	bbl/d
Mass Density(Total)	7.8727	lb/gal

Percent H2O in Liquids: 72.85%

Annual tank loss calculations for "22".
Total working and breathing losses from the Vertical Cylinder are 0.242 ton/yr.
Flashing losses are 0.9837 ton/yr.
Loading losses are 0.1973 ton/yr of loaded liquid.
* Only Non-Exempt VOCs are reported.

Tank-1

Temperature(Total)	76.165	°F
Pressure(Total)	103	psia
Mole Fraction Vapor(Total)	100	%
Mole Fraction Light Liquid(Total)	0	%
Mole Fraction Heavy Liquid(Total)	0	%
Std Vapor Volumetric Flow(Total)	75	MMSCFD

Names	Units	Liquid Loaded	22	14
Temperature	°F	69.823	69.817	55
Pressure	psia	14.696*	14.2	65
Volume Fraction Vapor	%	0	2.4526	0
Volume Fraction Light Liquid	%	31.071	30.306	100
Volume Fraction Heavy Liquid	%	68.929	67.241	0
Mass Fraction Vapor	%	0	0.0042516	0
Mass Fraction Light Liquid	%	27.094	27.091	100
Mass Fraction Heavy Liquid	%	72.906	72.905	0
Molecular Weight	lb/lbmol	23.143	23.143	18.023
Mass Flow	lb/h	903.55	903.55	166.5
Mass Volume	ft^3/lb	0.01698	0.017406	0.016022
Std Vapor Volumetric Flow	MMSCFD	0.35557	0.35557	0.084142
Std Liquid Volumetric Flow	sgpm	1.9132	1.9132	0.33299
Specific Gravity		0.94425		1.0007
API Gravity		17.964		9.9916
Net Ideal Gas Heating Value	Btu/ft^3	297.85	297.85	0.13355
Net Liquid Heating Value	Btu/lb	4064.4	4064.4	-1056.2
Water(Mass Fraction)	%	72.853	72.853	99.92
Water(Volumetric Flow)	bbl/d	45.172	45.215	11.395
Water(Mass Flow)	lb/h	658.27	658.27	166.37
H2S(Mass Flow)	lb/h	0.00060993	0.00060993	1.3142e-05
H2S(Mass Flow)	ton/yr	0.0026715	0.0026715	5.7563e-05

Analysis Certificate Report
Lucid Energy Group-PURCHASER

11/17/2018 5:19 PM

326 W. Quay
Artesia, NM 88210
Measurement 575-810-6045 or 575-810-6044

Kerry Egan

Analysis ID: 14434 Alternate ID: Use Contract Values: No

Name Thistle Loop CDP Company Name: Lucid Energy Group

Effective Date:	10/01/2018 08:00	Saturated HV:	1091.5	Sample Date:	10/17/2018
Valid Thru Date:	12/31/2078 00:00	As Del. HV:	1110.9	Sample ID:	
Fixed Edit Date:	01/01/1900 00:00	Dry HV:	1110.9	Sample Type:	Composite
Last Update:	11/12/2018 16:32	Measured HV:		Sample Pressure Base:	14.650
Data Acqusition:	File Transfer from Lab	WOBBE:	1207.5	Sample Temperature:	69.9
Data Source:	Lab Analysis	Water Content:		Sample Pressure:	88.3
Real Relative Density:	0.8465	Status:	Active	Lab Code:	M54880

Component	% Mol	GPM
Methane	66.3720	
Ethane	9.6340	2.5719
Propane	5.4250	1.4919
I Butane	0.6820	0.2228
N Butane	1.5780	0.4966
I Pentane	0.4160	0.1519
N Pentane	0.4050	0.1465
Hexanes +	0.5100	0.2222
Nitrogen	2.9980	
CO2	11.9800	
Oxygen	0.0000	
H2O	0.0000	
CO	0.0000	
H2S	0.0000	
Hydrogen	0.0000	
Helium	0.0000	
Argon	0.0000	
Total	100.0000	5.3038

Dry Gravity

Saturated Gravity

Sample Comments:

Configuration Comments:

Analysis Certificate Report
Lucid Energy Group-PURCHASER

11/17/2018 5:18 PM

326 W. Quay
Artesia, NM 88210
Measurement 575-810-6045 or 575-810-6044

Kerry Egan

Analysis ID: 104203 Alternate ID: Use Contract Values: No

Name WINDWARD CDP Company Name: Lucid Energy Group

Effective Date:	09/01/2018 09:00	Saturated HV:	1106.2	Sample Date:	09/19/2018
Valid Thru Date:	12/31/2078 00:00	As Del. HV:		Sample ID:	
Fixed Edit Date:	01/01/1900 00:00	Dry HV:	1125.8	Sample Type:	Composite
Last Update:	10/03/2018 09:05	Measured HV:		Sample Pressure Base:	14.730
Data Acqusition:	Manual Entry	WOBBE:	1271.0	Sample Temperature:	82.4
Data Source:	Lab Analysis	Water Content:		Sample Pressure:	96.0
Real Relative Density:	0.7846	Status:	Active	Lab Code:	P55845

Component	% Mol	GPM
Methane	72.9320	
Ethane	9.0530	2.4291
Propane	4.5640	1.2615
I Butane	0.5670	0.1862
N Butane	1.3240	0.4188
I Pentane	0.3360	0.1233
N Pentane	0.3370	0.1226
Hexanes +	0.3700	0.1620
Nitrogen	2.1160	
CO2	8.4010	
Oxygen	0.0000	
H2O	0.0000	
CO	0.0000	
H2S	0.0000	
Hydrogen	0.0000	
Helium	0.0000	
Argon	0.0000	
Total	100.0000	4.7035

Dry Gravity

Saturated Gravity

Sample Comments:

Configuration Comments:

Amine Plant

Std Vapor Volumetric Flow(Total)	45.5*	MMSCFD

"Acid Gas" HAPs = 14.42 lb/h	"Vent Gas" HAPs = 16.02 lb/h
"Acid Gas" HAPs = 63.16 ton/yr	"Vent Gas" HAPs = 70.19 ton/yr
"Acid Gas" VOCs = 15.83 lb/h	"Vent Gas" VOCs = 37.27 lb/h
"Acid Gas" VOCs = 69.34 ton/yr	"Vent Gas" VOCs = 163.2 ton/yr

Names	Units	Vent Gas
n-Hexane(Mass Flow)	ton/yr	0.27074
Benzene(Mass Flow)	ton/yr	18.422
Toluene(Mass Flow)	ton/yr	26.91
Ethylbenzene(Mass Flow)	ton/yr	2.7896
m-Xylene(Mass Flow)	ton/yr	7.9178
o-Xylene(Mass Flow)	ton/yr	3.5763
H2S(Mass Flow)	ton/yr	2.1743

Names	Units	Vent Gas
H2S(Mole Fraction)	ppm	45.861

Properties	AmineCirc	
Std Liquid Volumetric Flow(Total)	300*	sgpm
Composition	AmineCirc	
MDEA(Mass Fraction, Total)	40	%
DEA(Mass Fraction, Total)	10	%
Water(Mass Fraction, Total)	49.761	%

Properties	Bypass	
Std Vapor Volumetric Flow (Total)	0*	MMSCFD

Properties	14	
Pressure(Total)	950#	psig

Properties	1	
Pressure(Total)	900	psig

Properties	Rich Amine	
Pressure(Total)	900	psig

Properties	6	
Std Vapor Volumetric Flow (Total)	5.4545	MMSCFD
Temperature(Total)	207.99	°F
Pressure(Total)	8	psig
Mass Fraction Vapor(Total)	100	%
Composition	6	
Water(Mass Flow , Total)	94.656	lb/min

Properties	Sour Feed	
Std Vapor Volumetric Flow (Total)	45.5*	MMSCFD
Pressure(Total)	900*	psig
Temperature(Total)	100*	°F

Stage3Diameter	48*	in
Stage3Flooding	90.526	%
RichCO2approach	71.346	%
RichH2SApproach	65.773	%
LeanCO2Approach	0.065492	%
LeanH2SApproach	10.315	%

Names	Units	12	13	5
Temperature	°F	279.89	247.89	247.1
Pressure	psig	50	10*	10
Std Liquid Volumetric Flow	sgpm	1200	1200	1498.7
Volume Fraction Vapor	%	0	97.278	0
Water(Mass Flow)	lb/min	5093.7	5093.7	6361.4

Names	Units	Lean Amine into HX	Rich Amine
Total Acid Gas Loading/Mole Amine		0.01259	0.44409

Names	Units	Sour Feed	Sales Gas	Fuel Gas	Vent Gas	Bypass	Sweet Gas
Std Vapor Volumetric Flow	MMSCFD	45.5*	41.712	0.6236#	2.8927	0*	42.335
Carbon Dioxide(Mole Fraction)	%	6.869*	1.155	1.155	90.239	6.904	1.155
H2S(Mole Fraction)	ppm	3*	0.027613	0.027613	45.861	2.9812	0.027613

Names	Units	Heater Duty
Energy Rate	MMBTU/h	20.16*

23690	gal/d

Fuel Gas
Sales Gas
SPLT-102
MIX-101
Bypass
Sweet Gas
Circulation Pump
Circulation Pump Duty
Absorber
Lean Amine Cooler Duty
Lean Amine Cooler
Flash Gas
Makeup
Amine Makeup
AmineCirc
Recycle Guess
Recycle
Blowdown
Vent Gas
MIX-100
Acid Gas
Condenser
Condenser Duty
reflux
Sour Feed
Saturator
Water (Saturant)
VSSL-100
SPLT-101
Rich Amine
Rich Flash
Lean/Rich Exch
Rich into HX
lean out
Rich into Still
MIX-102
Stripper
VLVE-100
Booster Pump
SPLT-100
Bryan Boiler
Heater Duty
Q-1
Lean Amine into HX

MITCHELL ANALYTICAL LAB
2638 FAUDREE
ODESSA, TEXAS 79765-8538
432.561.5579

SUMMARY OF CHROMATOGRAPHIC ANALYSIS

Company:	AMI Measurement	Sample Press:	924.70
Producer:	Lucid Energy	Sample Temp:	80.00
Lease:	Frac Cat Compressor	Date Sampled:	9/28/2018
Station:	n.a.	Sampled by:	CV
Date Run:	10/9/2018	Field H2S:	0.0003
Lab Ref#:	18-OCT-96488		

COMPONENT	MOLE %	WEIGHT %
HYDROGEN SULFIDE	0.0003	0.0004
NITROGEN	2.4095	2.9407
OXYGEN	0.0000	0.0000
METHANE	72.8892	50.9425
CARBON DIOXIDE	6.8690	13.1709
ETHANE	9.7043	12.7128
PROPANE	4.6144	8.8649
ISO-BUTANE	0.5764	1.4596
N-BUTANE	1.3785	3.4906
ISO-PENTANE	0.3729	1.1721
N-PENTANE (C-5)	0.4036	1.2686
2,2 DIMETHYL BUTANE	0.0010	0.0038
CYCLOPENTANE	0.0000	0.0000
2-METHYLPENTANE	0.0338	0.1269
3-METHYLPENTANE	0.0173	0.0650
N-HEXANE (C-6)	0.0412	0.1547
METHYLCYCLOPENTANES	0.0218	0.0799
BENZENE	0.0208	0.0708
CYCLOHEXANE	0.0328	0.1203
2-METHYLHEXANE	0.0057	0.0249
3-METHYLHEXANE	0.0131	0.0572
DIMETHYLCYCLOPENTANES	0.0088	0.0376
HEPTANES	0.0091	0.0397
N-HEPTANE (C-7)	0.0253	0.1104
METHYLCYCLOHEXANE	0.0302	0.1265
TOLUENE	0.0421	0.1690
OCTANES	0.0853	0.4245
N-OCTANE (C-8)	0.0202	0.1005
ETHYL BENZENE	0.0095	0.0439
P-M-XYLENE	0.0426	0.1970
O-XYLENE	0.0105	0.0486
NONANES	0.0472	0.2637
N-NONANE (C-9)	0.0221	0.1235
DECANES	0.0593	0.3676
N-DECANE (C-10)	0.0324	0.2008
UNDECANES PLUS	0.1498	1.0201
TOTALS	**100.0000**	**100.0000**

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

AVE MOLE WT	22.9531
REL DENS, AIR=1	0.7925
VAPOR PRESS PSIA	3732.1

HEXANES PLUS SUMMARY

AVE MOLE WT	116.7500
SP GRAV, 60F/60	0.7480
API GRAVITY	57.7
LBS/GAL	5.984
REL DENS, AIR=1	4.0309
VAPOR PRESS PSIA	1.47

BTEX SUMMARY

WT % BENZENE	0.0708
WT % TOLUENE	0.1690
WT % E BENZENE	0.0439
WT % XYLENES	0.2456

HEATING VALUE

BTU/CUFT, DRY	1170.9
BTU/CUFT, SATURATED	1150.5

MITCHELL ANALYTICAL LABORATORY

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Odessa, Texas 79765-8538
(432) 561-5579

Gas Analysis

Company:	AMI (371)		
Producer:	Lucid Energy	Sample Pressure:	924.7
Lease:	Frac Cat Compressor	Sample Temp:	80.0
Station #:	n.a.	Date Sampled:	9/28/2018
Date Run:	10/17/2018	Sampled by:	CV
Lab Ref #:	18-OCT-96488	Field Gravity:	
Cylinder:		Field H2S:	0.00025
Analyzed by:	Blake		

Physical Constants per GPA 2145-09
All values calculated @ 60.0 Deg. F.

	Mole %	14.65 psia GPM (Ideal)	14.73 psia GPM (Ideal)	14.73 psia BTU (Ideal Dry)
Nitrogen	2.4095			0.000
CO2	6.8688			0.000
H2S	0.0003			0.000
Methane	72.8892			740.200
Ethane	9.7043	2.581	2.597	172.600
Propane	4.6144	1.264	1.272	116.700
Iso-Butane	0.5764	0.188	0.189	18.800
N-Butane	1.3785	0.432	0.435	45.200
Iso-Pentane	0.3729	0.136	0.136	15.000
N-Pentane	0.4036	0.145	0.146	16.300
Hexanes +	0.7821	0.345	0.347	41.500
TOTALS	**100.0000**	**5.090**	**5.122**	**1166.400**

GROSS HEATING VALUE @ 14.73 psia

Dry	Wet	
1171	1152	BTU/Real Cu.Ft.
0.7895	0.7872	Specific Gravity (Real)
	1147	BTU/Ideal Cu.Ft.
0.7869		Specific Gravity (Ideal)
Z Factor :	0.9963	

GASOLINE CONTENT (GPM/Real)

Ethane and Heavier .	5.1091
Propane and Heavier	2.519
Butane and Heavier .	1.2502
Pentane and Heavier	0.6283

Notes: Adjustment made for Field H2S

Since flares do not lend themselves to conventional emission testing techniques, only a few attempts have been made to characterize flare emissions. Recent EPA tests using propylene as flare gas indicated that efficiencies of 98 percent can be achieved when burning an offgas with at least 11,200 kJ/m^3 (300 Btu/ft^3). The tests conducted on steam-assisted flares at velocities as low as 39.6 meters per minute (m/min) (130 ft/min) to 1140 m/min (3750 ft/min), and on air-assisted flares at velocities of 180 m/min (617 ft/min) to 3960 m/min (13,087 ft/min) indicated that variations in incoming gas flow rates have no effect on the combustion efficiency. Flare gases with less than 16,770 kJ/m^3 (450 Btu/ft^3) do not smoke.

Table 13.5-1 presents flare emission factors, and Table 13.5-2 presents emission composition data obtained from the EPA tests.[1] Crude propylene was used as flare gas during the tests. Methane was a major fraction of hydrocarbons in the flare emissions, and acetylene was the dominant intermediate hydrocarbon species. Many other reports on flares indicate that acetylene is always formed as a stable intermediate product. The acetylene formed in the combustion reactions may react further with hydrocarbon radicals to form polyacetylenes followed by polycyclic hydrocarbons.[2]

In flaring waste gases containing no nitrogen compounds, NO is formed either by the fixation of atmospheric nitrogen (N) with oxygen (O) or by the reaction between the hydrocarbon radicals present in the combustion products and atmospheric nitrogen, by way of the intermediate stages, HCN, CN, and OCN.[2] Sulfur compounds contained in a flare gas stream are converted to SO_2 when burned. The amount of SO_2 emitted depends directly on the quantity of sulfur in the flared gases.

Table 13.5-1 (English Units). EMISSION FACTORS FOR FLARE OPERATIONS[a]

EMISSION FACTOR RATING: B

Component	Emission Factor (lb/10^6 Btu)
Total hydrocarbons[b]	0.14
Carbon monoxide	0.37
Nitrogen oxides	0.068
Soot[c]	0 - 274

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (µg/L); lightly smoking flares, 40 µg/L; average smoking flares, 177 µg/L; and heavily smoking flares, 274 µg/L.

Table 13.5-2. HYDROCARBON COMPOSITION OF FLARE EMISSION[a]

Composition	Volume %	
	Average	Range
Methane	55	14 - 83
Ethane/Ethylene	8	1 - 14
Acetylene	5	0.3 - 23
Propane	7	0 - 16
Propylene	25	1 - 65

[a] Reference 1. The composition presented is an average of a number of test results obtained under the following sets of test conditions: steam-assisted flare using high-Btu-content feed; steam-assisted using low-Btu-content feed; air-assisted flare using high-Btu-content feed; and air-assisted flare using low-Btu-content feed. In all tests, "waste" gas was a synthetic gas consisting of a mixture of propylene and propane.

References For Section 13.5

1. *Flare Efficiency Study*, EPA-600/2-83-052, U. S. Environmental Protection Agency, Cincinnati, OH, July 1983.

2. K. D. Siegel, *Degree Of Conversion Of Flare Gas In Refinery High Flares*, Dissertation, University of Karlsruhe, Karlsruhe, Germany, February 1980.

3. *Manual On Disposal Of Refinery Wastes, Volume On Atmospheric Emissions*, API Publication 931, American Petroleum Institute, Washington, DC, June 1977.

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-453/R-95-017
November 1995

Air

EPA

Protocol for Equipment Leak Emission Estimates

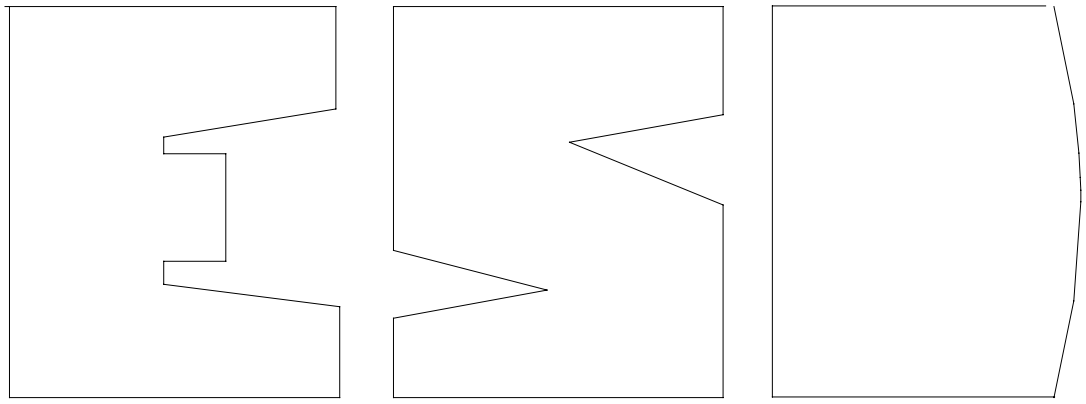


TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

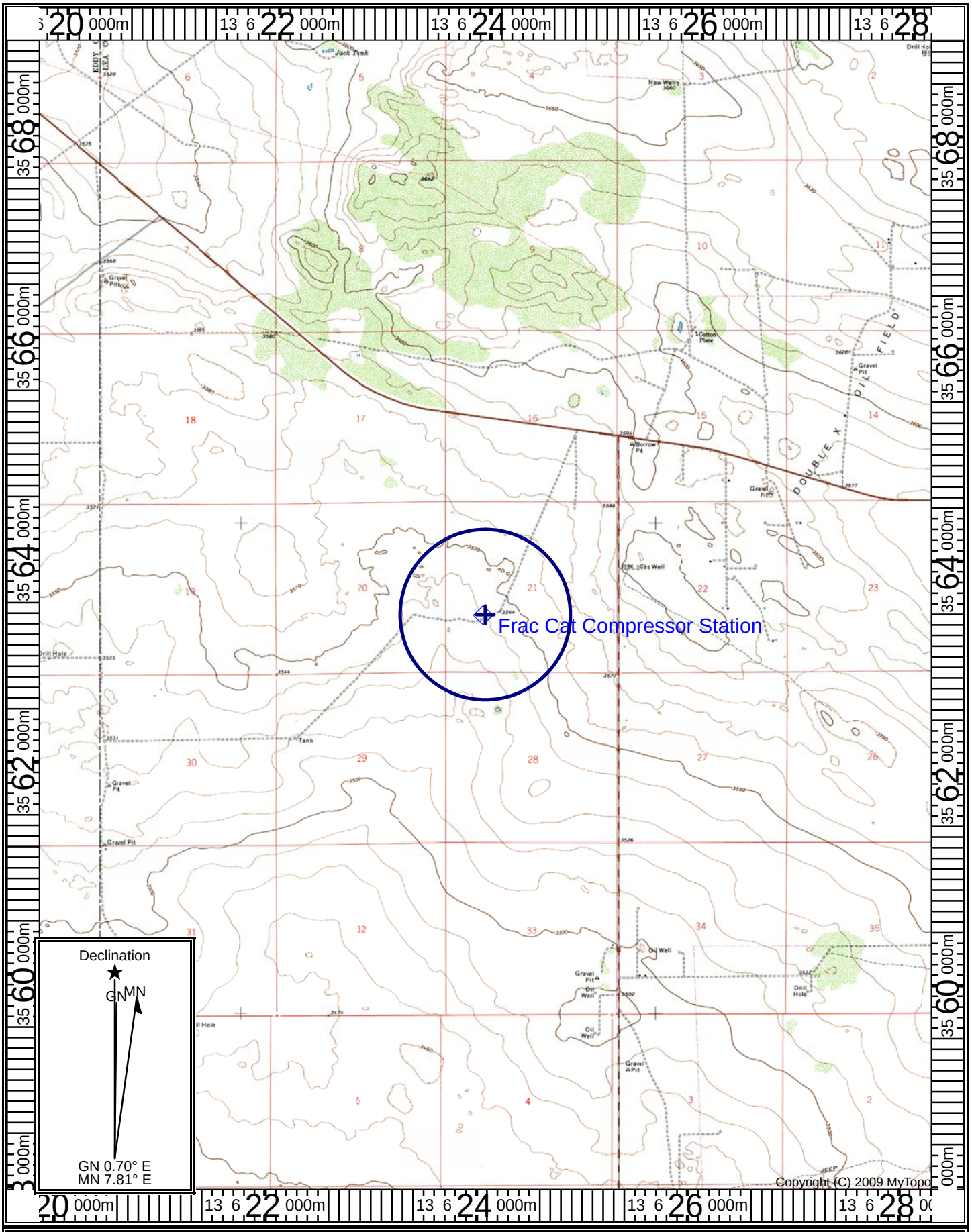
Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

A topographic map is attached.



Map Name: PADUCA BREAKS NW
Print Date: 07/22/16

Scale: 1 inch = 4,000 ft.
Map Center: 13 0624014 E 3563441 N

Horizontal Datum: WGS84

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)

(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

Public notice is not required for this application as it is for a Title V permit submitted under 20.2.70 NMAC. Public notice was last completed for this site with the NSR permit application submitted in December 2018.

Section 10

Written Description of the Routine Operations of the Facility

---

A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

The Frac Cat natural gas compressor station is part of a localized gas gathering system that gathers sweet field gas from multiple wells in the area. The SIC code for the facility is 1311. The facility is located in Section 21, Township 24 South, Range 32 East in Lea County.

Low pressure field gas is gathered from various wells in the area. The gas is compressed by natural gas engine driven compressors. Natural gas combustion in internal combustion compressor engines is considered to generate emissions of nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC) - which include several HAPs. Maximum emissions from the compressor engine are calculated based on emission factors provided by the manufacturers. All emission values listed in the application forms for the engines corresponds to 100% load at maximum engine speed.

Minor amounts of hydrocarbon liquids and water are collected in the inlet separator and are stored in atmospheric storage tanks.

Once the gas is compressed, it is treated by an amine system for carbon dioxide removal. The amine system incorporates two sources of air emissions: (1) gas-fired reboiler burners, and (2) gas vent that is controlled by a control flare.

After amine treatment, it is treated using a glycol dehydration system to remove entrained water. The glycol dehydration units incorporate two distinct sources of air emissions: (1) gas-fired reboiler burners, and (2) a glycol recovery still. Emissions generated in the reboiler burners exhaust to atmosphere through a distinct stack dedicated to the flow of combustion byproducts. The gas flowrate through the dehy units is limited by the engine capacity, and field conditions.

Emissions from the glycol recovery stills consist of water vapor and various volatile organic compounds (VOC), including several hazardous air pollutants (HAPs). The vent stream from the glycol recovery stills is controlled by a condenser. Noncondensable vapors passing through the condenser are routed to the reboiler fuel system for further control of emissions. Maximum emissions from the glycol recovery still are calculated in accordance with department policy using *Promax*, a software package developed by Bryan Research and Engineering. The composition of the wet gas introduced to the glycol dehydration units was based off a representative sample taken at a facility operating in a similar manner, using appropriate analytical techniques. This information was entered to the program to calculate emissions from the glycol recovery still.

The glycol dehydration unit is also equipped with a flash tank. The vent stream from the flash tank will not be allowed to vent to the atmosphere. The flash tank off gases will either be recovered as product or recovered as fuel. These emissions are calculated in the *Promax* program.

The units will be equipped with a condenser/incinerator device (i.e. reboiler) to control VOC and HAP emissions. The emissions from the recovery still will be condensed and the liquid phase will be pumped to the oily wastewater tank on-site. The gaseous phase will be incinerated in the reboiler burner or routed to the station inlet. The overall destruction efficiency of this control device will be at a minimum 95%, possibly greater.

The dehydrated gas is discharged from the station via pipeline to gas processing plants.

Each compressor engine at the site will be individually authorized to operate continuously at the design maximum capacity horsepower listed in the application. These engines will provide a maximum production capacity that is dependent upon the suction and discharge pressures at the facility, the number of wells connected to the facility, and the gas deliverability that each well provides the site. Per standard NMED permitting procedures, natural gas combustion in internal combustion compressor engines is considered to generate emissions of NOx, CO, and VOC. All of the units are equipped with oxidative catalysts to control CO, formaldehyde, and VOC emissions.

A blowdown vent is installed at the site to vent gas as necessary during certain shutdown and maintenance activities. These events will be permitted under unit SSM/M. During blowdowns, the gas lines at the facility on either the suction side of the compressors, the discharge side of the compressors, or both, are cleared prior to any maintenance that requires the disassembly or depressurization of the lines. Blowdown events are typically less than five minutes in duration and are expected to take place approximately once per month. Piping at the facility generally will be pressure rated to allow the field gas to be "shut in" at the wells for extended periods of time. Therefore, gas will not normally be released at the site during shutdown or upset conditions resulting from compressor malfunction or power loss.

The facility is authorized to operate continuously (8,760 hr/yr) at design maximum capacity processing rates. Lucid will minimize startup and shutdown activities at the facility in accordance with good operating principles and business objectives. This practice will serve to minimize total annual excess emissions from the facility due to startup, shutdown, and maintenance activities.

Section 11
Source Determination

Source submitting under 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC

Sources applying for a construction permit, PSD permit, or operating permit shall evaluate surrounding and/or associated sources (including those sources directly connected to this source for business reasons) and complete this section. Responses to the following questions shall be consistent with the Air Quality Bureau's permitting guidance, Single Source Determination Guidance, which may be found on the Applications Page in the Permitting Section of the Air Quality Bureau website.

Typically, buildings, structures, installations, or facilities that have the same SIC code, that are under common ownership or control, and that are contiguous or adjacent constitute a single stationary source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes. Submission of your analysis of these factors in support of the responses below is optional, unless requested by NMED.

A. Identify the emission sources evaluated in this section (list and describe)**:**
Frac Cat Compressor Station (see Form UA2 for a list of equipment).

B. Apply the 3 criteria for determining a single source:

SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.

☒ **Yes** ☐ **No**

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

☒ **Yes** ☐ **No**

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

☒ **Yes** ☐ **No**

C. Make a determination:

☒ The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all "**YES**" boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes "**NO**" to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.

☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 12

Section 12.A
PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

This section is not required for this application as it is for a Title V permit submitted under 20.2.70 NMAC.

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:
For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply**. **For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:
See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:
If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example,** if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:
For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:
All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVENT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: http://cfpub.epa.gov/adi/

Table for STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes	Facility	Lucid will meet all applicable requirements under 20.2.3 NMAC.
20.2.7 NMAC	Excess Emissions	Yes	Facility	This regulation establishes requirements for the facility if operations at the facility result in any excess emissions. The owner or operator will operate the source at the facility having an excess emission, to the extent practicable, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The facility will also notify the NMED of any excess emission per 20.2.7.110 NMAC.
20.2.23 NMAC	Fugitive Dust Control	No	N/A	As of January 2019, the only areas of the State subject to a mitigation plan per 40 CFR 51.930 are in Doña Ana and Luna Counties. As this site is located in Lea County, 20.2.23 NMAC is not applicable.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	No	N/A	This facility has no new or existing gas burning equipment having a heat input of greater than 1,000,000 million British Thermal units per year per unit. Therefore, this regulation is not applicable.
20.2.34 NMAC	Oil Burning Equipment: NO_2	No	N/A	This facility has no new or existing oil burning equipment having a heat input of greater than 1,000,000 million British Thermal units per year per unit. Therefore, this regulation is not applicable.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	No	N/A	The purpose of this regulation is to establish sulfur emissions standards for natural gas processing plants [20.2.35.6 NMAC]. This facility is not a natural gas processing plant as defined in the regulation [20.2.35.7 NMAC]. As this facility is not defined as a natural gas processing plant under this regulation, the facility is not subject to this regulation.
20.2.37 and 20.2.36 NMAC	Petroleum Processing Facilities and Petroleum Refineries	N/A	N/A	**These regulations were repealed by the Environmental Improvement Board. If you had equipment subject to 20.2.37 NMAC before the repeal, your combustion emission sources are now subject to 20.2.61 NMAC.**
20.2.38 NMAC	Hydrocarbon Storage Facility	No	N/A	This facility is a "New Hydrocarbon Storage Facility", but is not located within five miles of a municipality of 20,000 or more residents, does not contain storage vessels with the combine capacity of 65,000 gal or greater, and will not store hydrocarbon liquids with H_2S content of 24 ppm or greater; this regulation is not applicable.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	No	N/A	This facility is not a sulfur recovery plant. This regulation does not apply.

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.61.109 NMAC	Smoke & Visible Emissions	Yes	17-0585, 13-0104, 17-0590, 17-0529, 17-0530, 17-0533, 17-0534, 18-1279, 1, 2, 3, 4, 5, RBL-1, RBL-2, RBL-3, Flare-1	The objective of this part is to establish controls on smoke and visible emissions from certain sources. All stationary combustion equipment (engines, heaters, and flares) at the facility are subject to this regulation and comply by limiting opacity to a maximum of 20%.
20.2.70 NMAC	Operating Permits	Yes	Facility	As this facility is a Title V source, this regulation applies.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	This regulation establishes a schedule of operating permit emission fees. The facility is subject to 20.2.70 NMAC and is therefore subject to requirements of this regulation.
20.2.72 NMAC	Construction Permits	Yes	Facility	The objective of this part is to establish the requirements for obtaining a construction permit. The facility is subject as emissions are greater than 10 lb/hr and 25 tpy of regulated air contaminants for which there are National or New Mexico Ambient Air Quality Standards. The facility is currently permitted under NSR permit 4221-M6.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Yes	Facility	This regulation establishes emission inventory requirements. The facility meets the applicability requirements of 20.2.73.300.A.1 NMAC.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)	No	N/A	This regulation establishes requirements for obtaining a PSD permit. This facility does not have emissions greater than the PSD major source thresholds. Accordingly, this regulation does not apply.
20.2.75 NMAC	Construction Permit Fees	No	N/A	This regulation does not apply because the application is for a Title V permit submitted under 20.2.70 NMAC.
20.2.77 NMAC	New Source Performance	Yes	Units subject to 40 CFR 60	This regulation applies to all sources which are subject to the requirements of 40 CFR Part 60, as amended through January 15, 2017.
20.2.78 NMAC	Emission Standards for HAPS	No	N/A	This part applies to the owner or operator of any stationary source for which a standard is prescribed under this part. No subparts of 40 CFR 61 are applicable to this facility, and, therefore, this regulation does not apply.
20.2.79 NMAC	Permits – Nonattainment Areas	No	N/A	This regulation establishes the requirements for obtaining a non-attainment area permit. The facility is not located in a non-attainment area and therefore is not subject to this regulation.
20.2.80 NMAC	Stack Heights	No	N/A	This regulation establishes requirements for the evaluation of stack heights and other dispersion techniques. This regulation does not apply as all stacks at the facility will follow good engineering practice.
20.2.82 NMAC	MACT Standards for source categories of HAPS	Yes	Units Subject to 40 CFR 63	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63, as amended through August 29, 2013.

Table for FEDERAL REGULATIONS:

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes	Facility	This regulation defines national ambient air quality standards. The facility meets all applicable national ambient air quality standards for NO_x, CO, SO_2, H_2S, PM_{10}, and $PM_{2.5}$ under this regulation.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	Units subject to 40 CFR 60	This regulation is applicable as 40 CFR 60 subparts JJJJ and OOOOa are applicable to sources located at the facility.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**	No	N/A	This regulation establishes standards of performance for electric utility steam generating units. This regulation does not apply because the facility does not operate any electric utility steam generating units.
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**	No	N/A	This regulation establishes standards of performance for industrial-commercial-institutional steam generating units. This regulation does not apply because the facility does not operate any industrial-commercial-institutional steam generating units with heat inputs greater than 100 MMBtu/hr.
40 CFR 60.40c, Subpart Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	Yes	REB-3	This regulation establishes standards of performance for steam generating units for which construction commenced after June 9, 1989 and that have a design capacity between 10 MMBtu/hr and 100 MMBtu/hr. This regulation applies to REB-3 as this unit is rated at 21 MMBtu/hr. Lucid will comply with any applicable requirements under Subpart Dc for REB-3. All other steam generating units onsite are rated less than 10 MMBtu/hr and therefore Subpart Dc does not apply.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for **Storage Vessels for Petroleum Liquids** for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and **Prior** to July 23, 1984	No	N/A	This regulation establishes performance standards for storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after May 18, 1978, and prior to July 23, 1984. The tanks located at the facility were constructed after July 23, 1984, therefore this regulation does not apply.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for **Volatile Organic Liquid Storage Vessels** (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced **After** July 23, 1984	No	N/A	This facility has storage vessels with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984. However, this subpart does not apply as per 60.110b(d)(4) Vessels with a design capacity less than or equal to 1,589.874 m^3 used for petroleum or condensate stored, processed, or treated prior to custody transfer.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**	No	N/A	This regulation establishes standards of performance for stationary gas turbines. The facility does not operate stationary gas turbines and is therefore not subject to this regulation.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from **Onshore Gas Plants**	No	N/A	This regulation establishes standards of performance for equipment leaks of VOC from onshore natural gas processing plants for which construction, reconstruction, or modification commenced after January 20, 1984, and on or before August 23, 2011. The facility is not a natural gas processing plant as defined in this regulation [40 CFR Part 60.631]. This regulation does not apply because this facility does not meet the definition of a natural gas processing plant as stated in the regulation.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for **Onshore Natural Gas Processing**: SO_2 Emissions	No	N/A	This regulation establishes standards of performance for SO_2 emissions from onshore natural gas processing for which construction, reconstruction, or modification commenced after January 20, 1984 and on or before August 23, 2011. The facility is not considered a natural gas processing plant and therefore is not subject to this regulation.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015	Yes	17-0530, 17-0533, 17-0534, Potentially 1-5	The storage tanks installed at the facility have less than 6 tpy of VOC emissions and are therefore not subject to NSPS OOOO. The compressors associated with engines 17-0530, 17-0533, and 17-0534 are subject to this regulation. Units 1-5 are potentially subject to this regulation; the OOOO applicability for these units will be determined once they have been purchased.
NSPS 40 CFR Part 60 Subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015	Yes	13-0104, 17-0585, 17-0590, 17-0529, 18-1279, FUG Potentially 1-5	The compressors associated with units 17-0585, 13-0104, 17-0590, 17-0529, and 18-1279 are subject to the compressor portion of NSPS Subpart OOOOa. The compressors associated with units 1-5 may potentially be subject to NSPS OOOOa and will be determined once the units have been purchased and installed at the facility. Fugitive emissions at the facility are subject to NSPS OOOOa.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	No	N/A	The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition internal combustion engines. The engines at this facility are not compression ignition, and therefore this regulation does not apply.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Yes	13-0104, 17-0530, 17-0533, 17-0534, 17-0585, 17-0590, 17-0529, 18-1279, Potentially 1-5	Units 13-0104, 17-0530, 17-0533, 17-0534, 17-0585, 17-0590, 17-0529, and 18-1279 are subject to NSPS JJJJ. Units 1-5 may be subject; applicability will be determined once these units have been purchased.
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	No	N/A	This subpart establishes emission standards and compliance schedules for the control of greenhouse gas (GHG) emissions from a steam generating unit, IGCC, or a stationary combustion turbine. This facility includes neither an IGCC or a stationary combustion turbine, and therefore this regulation does not apply.
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units	No	N/A	This subpart establishes emission guidelines and approval criteria for state or multi-state plans that establish emission standards limiting greenhouse gas (GHG) emissions from an affected steam generating unit, integrated gasification combined cycle (IGCC), or stationary combustion turbine. This facility is not an IGCC or stationary combustion turbine and therefore is not subject to this regulation.
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills	No	N/A	This facility is not classified as a municipal solid waste landfill; this regulation does not apply.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	N/A	This part applies to the owner or operator of any stationary source for which a standard is prescribed under this part. No subparts of 40 CFR 61 are applicable to this facility, and, therefore, this regulation does not apply.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**	No	N/A	The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge. This facility does not process mercury therefore this regulation does not apply.
NESHAP 40 CFR 61 Subpart V	National Emission Standards for **Equipment Leaks** (Fugitive Emission Sources)	No	N/A	The provisions of this subpart apply to each of the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart. VHAP service means a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight of VHAP. VHAP means a substance regulated under this subpart for which a standard for equipment leaks of the substance has been promulgated. Benzene is a VHAP (See 40 CFR 61 Subpart J). The regulated activities subject to this regulation do not take place at this facility. The facility is not subject to this regulation.
MACT 40 CFR 63, Subpart A	General Provisions	Yes	Units Subject to 40 CFR 63	This part contains national emission standards for hazardous air pollutants (NESHAP). It applies if any other subpart applies. Subparts HH and ZZZZ apply, and therefore this subpart applies.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
MACT 40 CFR 63.760 Subpart HH	**Oil and Natural Gas Production Facilities**	Yes	DEHY-1, DEHY-2	This subpart applies to owners and operators of emissions points including glycol dehydration units, and storage vessels with the potential for flash emissions This facility is subject to the requirements of 40 CFR 63 Subpart HH, which includes requirements applicable to area sources with TEG Dehydrators. The site is not a major source of HAPs, but an area source of HAPs and therefore subject to this subpart. The dehydrator has the potential to emit less than 1 tpy (0.90 megagram per year) of benzene, and it is therefore subject to the operating requirements of §63.764(e)(1)(ii).
MACT 40 CFR 63 Subpart HHH	National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities	No	N/A	This subpart applies to owners and operators of natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user (if there is no local distribution company), and that are major sources of hazardous air pollutants emissions as defined in §63.1271. This facility is not a natural gas transmission and storage facility as defined in this subpart. Therefore, this regulation does not apply
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters	Yes	RBL-1, RBL-2, RBL-3	This subpart establishes national emission limitations and work practice standards for hazardous air pollutants emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAP. This facility is a major source of HAP emissions and the listed reboilers will comply with any applicable requirements under Subpart DDDDD.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit	No	N/A	This subpart establishes national emission limitations and work practice standards for hazardous air pollutants emitted from coal- and oil-fired electric utility steam generating units (EGUs). This facility does not include an EGU and is therefore not subject to the regulation.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)	Yes	13-0104, 17-0530, 17-0533, 17-0534, 17-0585, 17-0590, 17-0529, 18-1279, 1-5	The engines at this facility are subject to MACT ZZZZ. Units 13-0104, 17-0530, 17-0533, 17-0534, 17-0585, 17-0590, 17-0529, and 18-1279 will comply with MACT ZZZZ by complying with NSPS JJJJ. Units 1-5 will comply with the requirements of MACT ZZZZ or will comply with this regulation by meeting the requirements of NSPS JJJJ if they are subject to that regulation.
40 CFR 64	**Compliance Assurance Monitoring**	No	N/A	There are no units that are major in and of themselves, and therefore this rule does not apply.
40 CFR 68	**Chemical Accident Prevention**	No	N/A	An owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process, as determined under §68.115 would be required to follow this regulation. This facility does not store any chemicals above these threshold quantities.
Title IV – Acid Rain 40 CFR 72	**Acid Rain**	No	N/A	This part establishes the acid rain program. This part does not apply because the facility is not covered by this regulation [40 CFR Part 72.6].
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions	No	N/A	This regulation establishes sulfur dioxide allowance emissions for certain types of facilities. This part does not apply because the facility is not the type covered by this regulation [40 CFR Part 73.2].

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
Title IV-Acid Rain 40 CFR 75	**Continuous Emissions Monitoring**	No	N/A	This facility does not generate commercial electric power or electric power for sale; this regulation does not apply.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**	No	N/A	This regulation establishes an acid rain nitrogen oxides emission reduction program. This regulation applies to each coal-fired utility unit that is subject to an acid rain emissions limitation or reduction requirement for SO_2. This part does not apply because the facility does not operate any coal-fired units [40 CFR Part 76.1].
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**	No	N/A	This regulation establishes a regulation for protection of the stratospheric ozone. The regulation is not applicable because the facility does not "service", "maintain" or "repair" class I or class II appliances nor "disposes" of the appliances [40 CFR Part 82.1(a)].

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

☒ **Title V Sources** (20.2.70 NMAC)**:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies** defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by 20.2.70.300.D.5(f) and (g) NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☐ **NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown** defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by 20.2.72.203.A.5 NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☒ **Title V** (20.2.70 NMAC)**, NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by 20.2.7.14.A and B NMAC. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.

- To the maximum extent practicable, the air pollution control equipment, process equipment, or processes, will be maintained and operated in a manner consistent with good practice for minimizing emissions;
- Repairs will be made in an expeditious fashion when the operator becomes aware that applicable emission limitations are being exceeded;
- Off-shift labor and overtime will be utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;
- Scheduled maintenance will be planned ahead to coincide with maintenance on other production equipment, or other source shutdowns, to the extent practicable;
- The amount and duration of the excess emissions (including any during bypass) periods will be minimized to the maximum extent practicable;
- All possible steps will be taken to minimize the impact of the excess emissions on ambient air quality; and,
- The facility will monitor all operations to ensure that excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Alternative Operating Scenarios: Provide all information required by the department to define alternative operating scenarios. This includes process, material and product changes; facility emissions information; air pollution control equipment requirements; any applicable requirements; monitoring, recordkeeping, and reporting requirements; and compliance certification requirements. Please ensure applicable Tables in this application are clearly marked to show alternative operating scenario.

Construction Scenarios: When a permit is modified authorizing new construction to an existing facility, NMED includes a condition to clearly address which permit condition(s) (from the previous permit and the new permit) govern during the interval between the date of issuance of the modification permit and the completion of construction of the modification(s). There are many possible variables that need to be addressed such as: Is simultaneous operation of the old and new units permitted and, if so for example, for how long and under what restraints? In general, these types of requirements will be addressed in Section A100 of the permit, but additional requirements may be added elsewhere. Look in A100 of our NSR and/or TV permit template for sample language dealing with these requirements. Find these permit templates at: https://www.env.nm.gov/aqb/permit/aqb_pol.html. Compliance with standards must be maintained during construction, which should not usually be a problem unless simultaneous operation of old and new equipment is requested.

In this section, under the bolded title "Construction Scenarios", specify any information necessary to write these conditions, such as: conservative-realistic estimated time for completion of construction of the various units, whether simultaneous operation of old and new units is being requested (and, if so, modeled), whether the old units will be removed or decommissioned, any PSD ramifications, any temporary limits requested during phased construction, whether any increase in emissions is being requested as SSM emissions or will instead be handled as a separate Construction Scenario (with corresponding emission limits and conditions, etc.

There are not any alternative operating scenarios being requested for this facility.

Section 16

Air Dispersion Modeling

1) Minor Source Construction (20.2.72 NMAC) and Prevention of Significant Deterioration (PSD) (20.2.74 NMAC) ambient impact analysis (modeling): Provide an ambient impact analysis as required at 20.2.72.203.A(4) and/or 20.2.74.303 NMAC and as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines found on the Planning Section's modeling website. If air dispersion modeling has been waived for one or more pollutants, attach the AQB Modeling Section modeling waiver approval documentation.
2) SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions during routine or predictable startup, shutdown, or maintenance (SSM) using realistic worst case scenarios following guidance from the Air Quality Bureau's dispersion modeling section. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions modeling requirements.
3) Title V (20.2.70 NMAC) ambient impact analysis: Title V applications must specify the construction permit and/or Title V Permit number(s) for which air quality dispersion modeling was last approved. Facilities that have only a Title V permit, such as landfills and air curtain incinerators, are subject to the same modeling required for preconstruction permits required by 20.2.72 and 20.2.74 NMAC.

What is the purpose of this application?	Enter an X for each purpose that applies
New PSD major source or PSD major modification (20.2.74 NMAC). See #1 above.	
New Minor Source or significant permit revision under 20.2.72 NMAC (20.2.72.219.D NMAC). See #1 above. **Note:** Neither modeling nor a modeling waiver is required for VOC emissions.	
Reporting existing pollutants that were not previously reported.	
Reporting existing pollutants where the ambient impact is being addressed for the first time.	
Title V application (new, renewal, significant, or minor modification. 20.2.70 NMAC). See #3 above.	X
Relocation (20.2.72.202.B.4 or 72.202.D.3.c NMAC)	
Minor Source Technical Permit Revision 20.2.72.219.B.1.d.vi NMAC for like-kind unit replacements.	
Other: i.e. SSM modeling. See #2 above.	
This application does not require modeling since this is a No Permit Required (NPR) application.	
This application does not require modeling since this is a Notice of Intent (NOI) application (20.2.73 NMAC).	
This application does not require modeling according to 20.2.70.7.E(11), 20.2.72.203.A(4), 20.2.74.303, 20.2.79.109.D NMAC and in accordance with the Air Quality Bureau's Modeling Guidelines.	

Check each box that applies:

☐ See attached, approved modeling **waiver for all** pollutants from the facility.
☐ See attached, approved modeling **waiver for some** pollutants from the facility.
☐ Attached in Universal Application Form 4 (UA4) is a **modeling report for all** pollutants from the facility.
☐ Attached in UA4 is a **modeling report for some** pollutants from the facility.
☒ No modeling is required.

Air dispersion modeling is not required with this application as it is for a Title V permit being submitted under 20.2.70 NMAC. Air dispersion modeling was last performed for this facility with the NSR permit application submitted in December 2018.

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history.

Compliance Test History Table

Unit No.	Test Type	Date Tested
17-0531	Quarterly	2/23/2018
17-0532	Quarterly	2/23/2018, 4/26/2018
17-0533	Quarterly	2/21/2018, 4/23/2018, 11/12/18, 2/12/2019, 9/26/2019, 12/5/2019
17-0534	Quarterly	2/22/2018, 4/24/2018, 11/12/18, 2/12/2019, 9/26/2019, 11/12/2019
17-0530	Quarterly	2/21/2018, 4/26/2018, 11/12/18, 2/12/2019, 8/28/2019, 11/12/2019
17-0529	Quarterly	2/21/2018, 4/24/2018, 11/12/18, 2/12/2019, 8/28/2019, 11/13/2019
17-0585	Quarterly	2/21/2018, 4/23/2018, 11/12/18, 8/27/2019, 11/12/2019
13-0104	Quarterly	2/22/2018, 4/25/2018, 11/12/18, 2/12/2019, 8/27/2019, 11/12/2019
17-0590	Quarterly	2/23/2018, 4/25/2018, 11/12/18, 2/12/2019, 8/28/2019, 12/5/2019
18-1279	Quarterly	2/12/2019, 8/27/2019, 11/12/2019
17-0531	JJJJ Annual	4/26/2018
17-0532	JJJJ Annual	4/23/2018
17-0533	JJJJ Annual	4/24/2018, 5/18/2020
17-0534	JJJJ Annual	4/26/2018, 5/19/2020
17-0530	JJJJ Annual	4/24/2018, 5/15/2020
17-0529	JJJJ Annual	4/23/2018, 5/15/2020
17-0585	JJJJ Annual	4/25/2018, 5/18/2020
13-0104	JJJJ Annual	4/25/2018, 5/11/2020
17-0590	JJJJ Annual	5/19/2020
18-1279	JJJJ Annual	5/11/2020

Section 18

Addendum for Streamline Applications

This Section is not applicable as this is not a streamline application.

Section 19

Requirements for Title V Program

Who Must Use this Attachment:

* Any major source as defined in 20.2.70 NMAC.
* Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
* Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
* Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.

19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

Any source subject to 40CFR, Part 64 (Compliance Assurance Monitoring) must submit all the information required by section 64.7 with the operating permit application. The applicant must prepare a separate section of the application package for this purpose; if the information is already listed elsewhere in the application package, make reference to that location. Facilities not subject to Part 64 are invited to submit periodic monitoring protocols with the application to help the AQB to comply with 20.2.70 NMAC. Sources subject to 40 CFR Part 64, must submit a statement indicating your source's compliance status with any enhanced monitoring and compliance certification requirements of the federal Act.

There are no units that are major in and of themselves, and therefore CAM does not apply.

19.2 - Compliance Status (20.2.70.300.D.10.a & 10.b NMAC)

Describe the facility's compliance status with each applicable requirement at the time this permit application is submitted. This statement should include descriptions of or references to all methods used for determining compliance. This statement should include descriptions of monitoring, recordkeeping and reporting requirements and test methods used to determine compliance with all applicable requirements. Refer to Section 2, Tables 2-N and 2-O of the Application Form as necessary. (20.2.70.300.D.11 NMAC) For facilities with existing Title V permits, refer to most recent Compliance Certification for existing requirements. Address new requirements such as CAM, here, including steps being taken to achieve compliance.

Based on the information and belief formed after reasonable inquiry, Lucid believes that the Frac Cat Compression Station is in compliance with each requirement applicable to the facility.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other

applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

As described in Section 19.2 and based on information and belief formed after reasonable inquiry, Lucid states that Frac Cat Compressor Station will continue to be operated in compliance with applicable requirements for which it is in compliance as of the submittal date of this application.

In addition, Lucid will meet additional applicable requirements that become effective during the permit term in a timely manner or on such a time schedule as expressly required by the applicable requirement. In the event that Lucid should discover new information affecting the compliance status of Frac Cat Compressor Station, Lucid will make appropriate notifications and/or take corrective actions as appropriate.

19.4 - Schedule for Submission of Compliance (20.2.70.300.D.10.d NMAC)

You must provide a proposed schedule for submission to the department of compliance certifications during the permit term. This certification must be submitted annually unless the applicable requirement or the department specifies a more frequent period. A sample form for these certifications will be attached to the permit.

Lucid is proposing a compliance certification schedule report submittal every 12 months.

19.5 - Stratospheric Ozone and Climate Protection

In addition to completing the four (4) questions below, you must submit a statement indicating your source's compliance status with requirements of Title VI, Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioners).

---

1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☐ **Yes** ☒ **No**

2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ **Yes** ☒ **No**

   (If the answer is yes, describe the type of equipment and how many units are at the facility.)

3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ **Yes** ☒ **No**

4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.) **N/A**

19.6 - Compliance Plan and Schedule

Applications for sources, which are not in compliance with all applicable requirements at the time the permit application is submitted to the department, must include a proposed compliance plan as part of the permit application package. This plan shall include the information requested below:

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)
A narrative description of your facility's compliance status with respect to all applicable requirements (as defined in 20.2.70 NMAC) at the time this permit application is submitted to the department.

B. Compliance plan: (20.2.70.300.D.11.B NMAC)
A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)
A schedule of remedial measures that you plan to take, including an enforceable sequence of actions with milestones, which will lead to compliance with all applicable requirements for your source. This schedule of compliance must be at least as stringent as that contained in any consent decree or administrative order to which your source is subject. The obligations of any consent decree or administrative order are not in any way diminished by the schedule of compliance.

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)
A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)
If your source is an acid rain source as defined by EPA, the following applies to you. For the portion of your acid rain source subject to the acid rain provisions of title IV of the federal Act, the compliance plan must also include any additional requirements under the acid rain provisions of title IV of the federal Act. Some requirements of title IV regarding the schedule and methods the source will use to achieve compliance with the acid rain emissions limitations may supersede the requirements of title V and 20.2.70 NMAC. You will need to consult with the Air Quality Bureau permitting staff concerning how to properly meet this requirement.

NOTE: The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

Based on information and belief formed after reasonable inquiry as described in Section 19.2, and with this filing, Lucid states that Frac Cat Compressor Station is in compliance with applicable requirements. No compliance plan, compliance schedule, or compliance reports are required.

In addition, based on information and belief formed after reasonable inquiry Lucid states that Frac Cat is not an acid rain source as defined at 40 CFR 72.6.

19.7 - 112(r) Risk Management Plan (RMP)

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

This facility is exempt from being subject to 40 CFR Part 68 as it handles naturally occurring hydrocarbon mixtures as stated in §68.115(b)(2)(iii).

19.8 - Distance to Other States, Bernalillo, Indian Tribes and Pueblos

Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B NMAC)?

(If the answer is yes, state which apply and provide the distances.)

Yes, 22.2km from Texas border; No Indian tribes, pueblos, or local pollution control programs are within 80km.

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:

Matt Eales - Vice President EHSR

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No other relevant information is being included in the application.

Section 21

Addendum for Landfill Applications

This Section is not applicable as this is not a landfill application.

Section 22: Certification

Company Name: Lucid Energy Delaware, LLC

I, Matt Eales, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 13 day of August, 2020, upon my oath or affirmation, before a notary of the State of New Mexico.

Matt Eales
*Signature

8-13-20
Date

Matt Eales
Printed Name

Vice President EHSR
Title

Scribed and sworn before me on this 13th day of August, 2020.

My authorization as a notary of the State of New Mexico expires on the 12th day of June, 2022.

Notary's Signature

Aug. 13th 2020
Date

Wilma M. Harmon
Notary's Printed Name

OFFICIAL SEAL
WILMA M. HARMON
NOTARY PUBLIC, STATE OF NEW MEXICO
MY COMMISSION EXPIRES 6-12-2022

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.